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McKnight (T. S.). **Some physical factors influencing the effectiveness of preservatives.**—*For. Prod. J.*, **7**, 12, pp. 441–444, 2 graphs, 1957.

Tests at the Forest Products Laboratories of Canada, Ottawa, indicated the effectiveness of pentachlorphenol against a typical brown rot, in this case caused by *Lenzites trabea*, to be independent of the swelling capacity of its solvent over a wide range, whereas with a white rot fungus (*Polyporus* [*Polystictus*] *abietinus*) the fungicide was more effective when deposited from a better wood swelling solvent than from a less efficient one. Data were evaluated by application of the logistic function.

Walters (C. S.) & Meek (W. L.). **Effect of soaking position on treatability of Pine fence posts.**—*For. Sci.*, **2**, 1, pp. 43–53, 1 fig., 4 graphs, 1956.

After a 24 hr. cold soak of shortleaf pine (*Pinus echinata*) posts submerged vertically in 5% pentachlorophenol [cf. **28**, p. 99] in No. 3 fuel oil, the average absorption was 5·21 lb./cu. ft., 88% of the sapwood being impregnated and the average gross toxicant conc. 0·69%; corresponding figures for horizontally placed posts were 4·37, 65, and 0·601. The drop in conc. of toxicant with increasing radial depth was greater in the latter, while the conc. at a depth of 0·91 in. in midpoint sections was more uniform in the former. The treatment variations resulting from difference in treatability of posts due to the different character of wood were very highly significant.

Morvan (G.). **La chlorantie, maladie à virus du Colza.** ['Chlorantie', a virus disease of Colza.]—*C. R. Acad. Agric. Fr.*, **44**, 10, pp. 505–508, 1958.

In 1956 and again in 1957 autumn turnip rape plants growing at the Centre National de Recherches Agronomiques, Versailles, appeared slightly taller than healthy ones, the angle formed by their peduncles was very acute, and the flower buds were almost spherical. The perianth was small with tongue-like petals and the stamens sometimes lacked anthers. The ovary, borne on a 1–4 cm. gynophore, became greatly enlarged, elongated, blistered, and bent over, occasionally degenerating completely. It was flattened at right angles to the false septum and the placentas formed a deep double furrow. In section the placentary region was almost normal, but the neighbouring tissues were hypertrophied, causing splitting. The ovules were attached to the placenta by funicles up to 2 mm. long. The disease also affected spring colza sown in autumn. Chip budding from affected plants reproduced the condition, probably caused by a virus.

Quak (Frederika). **Bladvlekkenziekte bij spruitkool veroorzakt door Mycosphaerella brassicicola (Fr.) Lindau.** [Ring spot disease of Brussels Sprouts caused by *Mycosphaerella brassicicola* (Fr.) Lindau.]—*Meded. Dir. Tuinb.*, **20**, pp. 317–320, 1 graph, 1957. [Reprinted as *Meded. Inst. plziekt. Onderz. Wageningen* 151, 1957. English summary.]

In a study of this disease [map 189: cf. **25**, p. 591] in N. Netherlands in 1955 the author found both mature and immature perithecia throughout the growing period, and ascospores were liberated throughout the year. Dithane Z-78 and captan were highly fungicidal to ascospores of *M. brassicicola in vitro* but did not reduce infection in field trials, possibly because of insufficient coverage and adherence. No resistance to the fungus was demonstrable in 40 vars. of Brussels sprouts.

Steudel (W.) & Blaesen (P.). **Bericht über die in den Jahren 1955 und 1956 durchgeführten Gemeinschaftsuntersuchungen zum Auf- bzw. Ausbau eines**

Blattlauswarndienstes im Rübenbau. [Report on the co-operative investigations carried out in the years 1955 and 1956 on the organization or extension of an aphid warning service in Beet cultivation.]—*Mitt. biol. ZentAnst. Berl.* 92, 37 pp., 5 graphs, 6 maps, 1958.

This is a detailed, tabulated survey of the populations and activities in W. Germany of the beet yellows virus vectors, *Myzodes* [*Myzus*] *persicae* and *Doralis* [*Aphis*] *fabae* [**37**, p. 614 *et passim*], in relation to a warning service. In both years the onset and peak of the flights from the winter hosts (peach trees) were earliest in the S.W. and latest in the N. and S.E. of the country. In 1955 severe infestation by *M. persicae* occurred only in parts of N. Rhine-Westphalia, where *A. fabae* was also prevalent, as well as in certain areas of Baden-Württemberg. In 1956 *M. persicae* was again fairly widespread in N. Rhine-Westphalia and also in the Rhine-Main region, while *A. fabae* was abundant, notwithstanding adverse weather conditions, throughout almost the entire Republic, its maximum density being in the Upper Rhine Valley. In neither year did *M. persicae* overwinter on herbaceous plants, e.g., cabbage and spinach, nor was there any appreciable infestation of such secondary winter hosts as *Prunus* spp., *Philadelphus coronarius*, and *Deutzia crenata*.

Epiphytotics of yellows developed in both seasons only in parts of N. Rhine-Westphalia, fodder beets sustaining the heaviest damage (62·6% in 1955 and 44·7 in 1956, as against 31·2 and 20·5 for sugar beets); elsewhere incidence of infection was mostly less than 5%. The average reductions for the 2 years were 17% in weight, 20% in sugar content, and 6% in tops. Spraying with systemic insecticides [**36**, p. 78] largely prevented damage by *A. fabae*, especially in 1956.

On the basis of these data the Republic is divided into 3 zones of varying vulnerability to mass outbreaks of yellows. Most severely threatened is the Cologne-Münster depression and its periphery, extending in highly unfavourable seasons to the Main-Upper Rhine and eastwards to the Weser. In this area all the essential conditions for an epiphytotic are realized, viz., early aphid development, numerous sources of infection, overwintering of aphids (*M. persicae* preponderating) in clamps, and regular heavy colonization of the host by *M. persicae*.

The S.W. is less endangered, though here too the aphids develop early. In general, however, *M. persicae* is less important than in the N.W., and the overwintering potential of the virosis seems to be rather weaker. In all other areas severe attacks are unlikely, since the aphids develop later and pay only occasional visits to beets, while sources of infection appear to be relatively infrequent.

Virusgulsot hos Bederoer i Danmark. [Virus yellows of Beets in Denmark.]—*Medd. Forsøgsv. Plantek. Kbh.* 600, 4 pp., 1958.

In 1957 beet yellows virus developed early and spread over an exceptionally wide area, including N. and W. Jutland, where it is normally unimportant. During the period 1954–57 the importance of sources of infection and the peach aphid [*Myzus persicae*: **35**, p. 258] was investigated at 10 of the State Experiment Stations. In the springs of 1954–56, inclusive, 10–13% of the clamps on a large number of the farms visited had aphids, the average percentages of yellows in the following Sept. of each year being 21, 23, and 10, respectively. In 1957 there were aphids in 45% of the clamps and the percentage of infection in the autumn was 52.

During the first 3 years 8–9 applications of systox, parathion, or idosect special were given at 3 Stations and produced extraordinarily heavy yield increases. For instance, the average weights of roots treated with 0·05% systox were 573 and tops 302 hkg./ha., while the corresponding figures for 0·05% parathion were 538 and 304, compared with 428 and 268 for the untreated. In 1957 only 2–3 treatments were given with meta-systox and parathion (both at 0·05%), but even on this reduced scale increases of up to 200 hkg./ha. were obtained.

Kovács (A.). **Virus yellows of Sugar and Forage Beets in Hungary.**—*Acta agron. Acad. sci. hung.*, **6**, 3–4, pp. 259–285, 1956. [*Biol. Abstr.*, **32**, 6, p. 1780, 1958.]

In 1953 the average amount of infection by beet yellows virus in beet seed crops in Hungary [**37**, p. 193], ascertained by a survey of 60% of the total area grown, was 50·4%. Sugar beet had 22·4% and forage beet up to 25·2% infection. Artificial infections on 18 and 22 June and 6 July produced losses of sugar yield amounting to 35·2, 12·9, and 4·2%, respectively; similar infections in another place on 18 May and 5 June gave 34 and 15% losses. These losses were primarily due to decreases in root weight. When plants taken from the field were grouped according to the presence or absence of symptoms, no difference in wt. was apparent, but when they were grouped according to serological evidence, the average wt. of infected plants was 11·2% less than that of the healthy.

Tests with chemicals to determine stomatal apertures showed that the rate of infiltration was much lower into leaves with yellows symptoms than into healthy. This difference decreased in passing from the older to the younger leaves of the rosette. Infiltration of the oldest leaves of sugar beet near a seed crop was less than those of plants further away, indicating that infested plants were more numerous near than further away. Affected plants were less resistant to *Cercospora* [*beticola*] than were healthy ones [cf. **36**, p. 294].

A 1:16 dilution of the sap from the leaves of affected plants induced complete haemolysis during summer, while a 1:8 dilution from healthy plants failed to dissolve sheep erythrocytes; this difference disappeared in autumn.

In an early-sown plot of sugar beet near a seed crop the correlation coefficients between the rate of infection and distance from the seed crop were 0·36 for yellows virus and 0·49 for beet mosaic virus; in a late-sown plot they were 0·73 and 0·84.

Schroeder (W. T.), Peck (N. H.), & Vittum (M. T.). **Purple blight—an undescribed disorder of Pisum sativum.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 264, 1958.

Affected pea plants, more susceptible when young, appear stiffly erect with sparse foliage. Brownish flecking on older stipules and leaves intensifies to a purplish-black desiccation of the oldest leaves. Stems and tendrils may have brown blotches, but roots are unaffected. There is no recovery. The disorder has occurred in 10 of the 14 years since it was first seen [in U.S.A.]; it is sporadic and does not always occur in the same area in successive years. Experiments suggest a nutritional cause, possibly toxic interactions of Mn, Fe, and Al.

Gabryl (J.). **Obserwacje nad stopniem porażenia przez choroby niektórych odmian Fasoli (Phaseolus vulgaris), przeprowadzone w Puławach w latach 1953–55.** [Observations on the amount of infection by some diseases of Beans (*Phaseolus vulgaris*) in Puławy in 1953–55.]—*Hodowla rośl. Aklim. Nasien.*, **2**, 2, pp. 262–283, 1958. [Russian and English summaries.]

Simultaneous observations in field and greenhouse in Poland showed that all the current bean vars. were susceptible to anthracnose (*Colletotrichum lindemuthianum*); Norida and Allerfrüheste Weisse were immune from blight (*Pseudomonas medicaginis* var. [f.sp.] *phaseolicola*) and 9 other vars., including Michigan, highly resistant; and Logan, Michigan, and Norida developed no symptoms of virus (*Phaseolus* viruses 1 and 2) [bean common mosaic and yellow mosaic viruses].

Llanos M. (Carmen). **Patogenicidad del Isariopsis griseola Sacc. en Frijol (Phaseolus vulgaris L.).** [Pathogenicity of *Isariopsis griseola* Sacc. for Beans (*Phaseolus vulgaris* L.).]—*Acta agron. Palmira*, **7**, 2, pp. 165–190, 12 fig., 1957. [English summary.]

Some of the information in this paper presented to the Facultad de Agronomía,

Palmira, Colombia, has been noticed [cf. **37**, p. 618 and below]. It was shown that light does not influence spore germination and that there is no loss of virulence after 5 or 6 transfers. R.H. of 95–100% is needed for artificial infection, the longer the exposure to high R.H. (40 hr. compared with 24 and 16), the greater the degree of infection. There was no difference in the infectivity of spores from the field and those from pure cultures.

Barros (O.), Cardona (C.), Cardeñosa (R.), & Skiles (R. L.). **The control of angular leaf spot of Bean in Colombia.**—*F.A.O. Pl. Prot. Bull.*, **6**, 7, pp. 97–101, 1958.

Details are given of spraying tests against angular leaf spot (*Isariopsis griseola*) on 5 vars. of beans [*Phaseolus vulgaris*] conducted at the Tulio Ospina Experiment Station, Medellin, Colombia, in 1954–5 [see above]. The number of sprays applied (250 gal. zineb/ha.+a sticker) may be safely reduced from 9 or 10 to 5 or 6.

Lopez (M. A.). **Efectividad de varios fungicidas en la represión del 'damping-off' y de la pudrición de semillas de Frijol (Phaseolus vulgaris L.).** [Effectiveness of various fungicides in the control of damping-off and seed decay in Beans (*Phaseolus vulgaris* L.).]—*Acta agron. Palmira*, **7**, 2, pp. 141–163, 4 fig., 1957. [English summary. 26 refs.]

In a paper presented to the Facultad de Agronomía, Palmira, Colombia, the author reviews recent literature dealing with seed treatment to control damping-off, with special reference to bean seeds [**36**, p. 80]. *Sclerotium* sp., *Fusarium* sp., and *Rhizoctonia* sp. were found to be the most prevalent fungi associated with this in the Cauca Valley, and agrox, ortho seed guard, and orthocide 75 (all at 2 oz./100 lb. seed) gave significantly better stands than the controls or 6 other chemicals tested.

Sirry (A. R.). **The effect of plant nutrition and soil moisture on Botrytis fabae Sard. on Broad Beans at Shebin El Kom, Egypt.**—*Ann. agric. Sci., Cairo*, **1**, 1, pp. 319–324, 1956. [Arabic summary. Received 1958.]

In pot and field experiments on chocolate spot of broad bean soil applications of N, P, and K in 8 possible combinations were combined with different watering treatments (2, 3, or 5 times). The test plants were left for natural infection, the extent of which was expressed as percentage infected leaf area. Pot and field results were similar, higher infection occurring in untreated plants (16 as against 5·9% in pots, 20 against 7% in field plots). P (superphosphate at 1·5 lb./sq. m.) reduced infection from 10·25–3·5% (pots) and 12·25–5·25% (field), while K (sulphate at 0·75 lb.) had a marked effect in the field (11·5% reduced to 6%). Plots given 5 waterings developed 34% infection compared with 20% on those given 2.

Srivastava (S. N. S.). **Studies on Centrospora acerina (Hartig) Newhall, the cause of licorice rot of Carrot.**—*Trans. Brit. mycol. Soc.*, **41**, 2, pp. 223–226, 1 pl., 1958.

Licorice rot of carrots was observed in Scotland [**37**, p. 196] in a field where they had been left over the winter. Only 1 of 3 vars. in the field was attacked. The symptoms were blackish, deeply sunk lesions with water soaked brown margins, sometimes girdling the roots and 4–6 cm. long. The fungus was shown to be pathogenic to celery. In culture it tolerated up to 400 p.p.m. Mo, B, or Zn, and 200 p.p.m. Cu. Sporulation was induced by irradiation of 4–5-day-old cultures with 1300 mW/sq. cm. for 5–15 min.

Simons (J. N.). **Titres of three nonpersistent aphid-borne viruses affecting Pepper in South Florida.**—*Phytopathology*, **48**, 5 (1), pp. 265–268, 6 graphs, 1958.

To investigate differences in rate of spread on *Capsicum frutescens* in the field in Florida between veinbanding mosaic virus (VBM, probably potato virus Y) and

southern cucumber mosaic virus (SCuM) and pepper calico virus (PCV) [**36**, pp. 567, 568] (both strains of cucumber mosaic virus), the titre of active virus in the host was measured at the Everglades Experiment Station. Since assay by single aphid (*Myzus persicae*) feeds and by mechanical transmission with sap diluted 1:500 were closely correlated, it was concluded that the former can give a useful measure of active virus. The titre of each virus rose to a max. in 2 weeks after inoculation, but that of SCuM and PCV then fell sharply. The conc. of VBM, on the other hand, which spreads the most rapidly, remained high and constant after 2 weeks, as it did in the weed hosts (*Solanum gracile* and *Commelina nudiflora*). Double infections with pairs of the viruses resulted in a decrease of the titre of each, regardless of the order of inoculation.

It is considered that the differences over a period in the activity curves of VBM on the one hand and the cucumber mosaic strains on the other may account for the differing rates of field spread.

Potter (H. S.), Cloniger (C. K.), & Drost (A.). **Foliar and soil applications of chemicals for the control of pink rot of Celery.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 4, pp. 734–739, 2 fig., 1958.

In the cool and wet growing season of 1956 heavy attacks by *Sclerotinia sclerotiorum* [cf. **33**, p. 469] occurred on celery in Michigan. In June 1957, 4 organic fungicides were applied to the soil in 11 different combinations before planting the var. Utah 16, or as foliar dusts or sprays from transplanting to 3 weeks before harvest. The best results were obtained with dust applications of 20% terraclor at 75 lb./acre (7·5% infection) or 2 sprays of 75% wettable powder at 20 lb./150 gal./acre (3·5%). One soil application of terraclor dust alone at 980 lb./acre (19%) or in combination with 31% vapam at 109 gal./acre (17%) or captan as 50% wettable powder at 200 lb./acre (10%), and 31% vapam at 109 gal./acre (24·5%) also proved beneficial, the controls contracting 40–59%.

Eno (C. F.) & Westgate (P. J.). **Row orientation and its effect on the growth of Celery and certain soil factors.**—*Proc. Fla hort. Soc.*, **70** (*1957*), pp. 115–120, 1958.

In a detailed study of the orientation of Pascal celery rows in relation to the production of the winter crop in the Sanford area of Florida in 1956 and 1957, it was found that rows running N. and S. had less late blight [*Septoria apii*: cf. **36**, p. 631] at harvest and less physiological black heart than rows running E. and W.

Darby (J. F.). **Fungicides for the control of early blight of Celery.**—*Proc. Fla hort. Soc.*, **70** (*1957*), pp. 134–136, 1958.

Three years' testing of various fungicides in the Sanford area against *Cercospora apii* [cf. **36**, pp. 631, 809] showed ferbam to be excellent. Tank-mix (1 qt. sodium dimethyl dithiocarbamate : 1 lb. $FeSO_4$) was as effective as the commercial preparation at 2 lb./100 gal. and much cheaper. Lithium carbonate showed promise when applied to the soil and as a foliar spray, though phytotoxic at the rates used. Dyrene [**37**, p. 244] and omadine zinc salt [**36**, p. 650] were outstanding.

Costa (A. S.) & Duffus (J. E.). **Observations on Lettuce mosaic in California.**—*Plant Dis. Reptr*, **42**, 5, pp. 583–586, 1958.

At Salinas, California, the susceptibility to lettuce mosaic virus [**37**, p. 436] of a number of weeds not previously reported as hosts, including *Lamium amplexicaule, Stellaria media, Chenopodium murale, C. album, Picris echioides, Capsella bursa-pastoris*, and others prevalent in the local lettuce-growing areas, was established by recovery of the virus from naturally infected field plants or by mechanical inoculation of healthy seedlings in the greenhouse.

HURNDELL (L. C.) & SMITH (H. C.). **Ringspot disease of Lettuce.**—*N.Z. J. Agric.*, **96**, 6, pp. 575–576, 2 fig., 1958.

At the Crop Research Division, Lincoln, New Zealand, in plot trials against lettuce ringspot (*Marssonina panattoniana*) [**37**, p. 436], very widespread in recent years, sprays of 50% captan and 75% thiram at 2 lb./100 gal., and 50% copper oxychloride at 5 lb. were compared with the same compounds as dusts (6% commercial strength in talc at 15–30 lb./acre), applied to inoculated plots every 10 days from 21 Aug.–19 Oct. 1956. The best results were obtained with the captan and thiram dusts and captan spray with 109, 100, and 102 marketable plants (practically all of which had some infection) out of 140, respectively, compared with a total rejection of plants on the control plots.

DEZEEUW (D. J.). **Cucurbit powdery mildew fungicide trials, 1956–57.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **40**, 4, pp. 811–821, 2 fig., 1958.

Local outbreaks of powdery mildew of cucurbits caused by a strain of *Erysiphe cichoracearum* [cf. **35**, p. 637] in Michigan led to a series of greenhouse experiments. Mildew indexes were determined by rating active infections on fully developed leaves according to scale: 0, none to 4, heavy infection with the death of the leaves. Four fungicidal applications gave the following indexes: karathane (16 oz./100 gal.) 0·84, CC 9116 (a heterocyclic compound containing N and S, 61·6% wettable powder, at 2 lb.) 1·16, and thioneb 50 W (1 lb.) 1·68, thus effectively suppressing powdery mildew and being only slightly phytotoxic. Six sprays of CC 9688 (a nitropolycyclic compound at 1 lb.), CC 10521 (an arylmercapto-N heterocyclic compound at 1 lb.), and thioneb 50 W (2 lb.) were more effective than karathane in reducing mildew in field trials but yield differences were not significant. Griseofulvin was ineffective in both spray and soil applications.

SCHENCK (N. C.) & CRALL (J. M.). **Five year summary on fungicidal control of Watermelon foliage diseases.**—*Proc. Fla hort. Soc.*, **70** (*1957*), pp. 107–109, 1958.

Further results of spraying tests at Leesburg, Florida, with 7 fungicides from 1953–57 against *Pseudoperonospora cubensis*, *Mycosphaerella citrullina* [*M. melonis*], *Colletotrichum lagenarium*, and *Cercospora citrullina* are presented [cf. **36**, p. 678]. Alternate applications of maneb (1½ lb./100 gal.) and zineb (2 lb./100 gal.) or zineb alone are recommended. Mixed applications with each at ½ strength or maneb alone are suggested for trial. Copper fungicides (1½ lb. active Cu/100 gal.) can be used effectively in alternation with zineb or maneb where the control of *P. cubensis* is of major importance.

JONES (J. P.). **Isolation of a sporulating strain of Cercospora kikuchii by selective sub-culturing.**—*Phytopathology*, **48**, 5 (1), pp. 287–288, 1958.

At the Delta Branch Mississippi Agricultural Experiment Station, Stoneville, a stable sporulating strain of *C. kikuchii* from soybean [**35**, p. 697] was secured by subculturing from small sporulating sectors in a plate culture [cf. **35**, p. 620] and repeating the process through 7 subcultures.

HARRISON (A. L.) & WATKINS (G. M.). **Terraclor for the control of southern blight of Peanuts.**—Abs. in *Phytopathology*, **48**, 6, p. 343, 1958.

In 1956 *Sclerotium rolfsii* on Spanish groundnuts [cf. **37**, p. 65] was controlled by spraying terraclor (75% PCNB) on to the crown at each cultivation (total application 15 lb./acre) and yield was increased by 211 lb./acre. In 1957 the increase was from 1,382 (untreated) to 2,047 lb., with no significant difference between treatments at 18 and 36 lb./acre.

Tarr (S. A. J.). **Control of seed-bed losses of Groundnuts by seed treatment.**—*Ann. appl. Biol.*, **46**, 2, pp. 178–185, 1958.

Fungicidal treatment of groundnut seed [cf. **36**, p. 384] by the Agricultural Research Division, Republic of the Sudan, usually reduced seed-bed losses and improved emergence, plant populations, and the yields both under rainfall in the sandy soils of west-central Sudan and under irrigation in the alkaline clay soils of the Gezira. The benefits were greatest with slightly damaged seeds, but accrued even when selected, undamaged seed was sown by hand; they were attributed to the protection afforded against soil micro-organisms, including *Aspergillus niger*, *A. flavus*, and *Rhizopus* spp. Agrosan GN (1% Hg equivalent) or 50% thiram powder [**34**, p. 707], both at 1 g./lb. seed, are regarded as suitable for the areas concerned.

Gorlenko (M. V.) & Bushkova (Mme L. N.). Сумчатая стадия возбудителя аскохитоза Нута. [Perfect state of the causal agent of ascochytosis of Chickpea.]—*Plant Prot., Moscow, 1958*, 3, p. 60, 1958.

Laboratory and greenhouse studies at Moscow University showed that *Mycosphaerella rabiei* [**37**, p. 627] is pathogenic only on chickpea [*Cicer arietinum*]. Ascocarps develop on plant remains in the field.

Chant (S. R.). **Studies on the transmission of Cassava mosaic virus by Bemisia spp. (Aleyrodidae).**—*Ann. appl. Biol.*, **46**, 2, pp. 210–215, 1958.

At the Federal Dept of Agric. Res., Ibadan, Nigeria, whiteflies (*Bemisia* sp.) obtained from cassava in the field needed to feed for at least 4 hr. on the young leaves of a cassava plant infected with mosaic virus [**36**, p. 683; **37**, p. 627] before they acquired the virus. Whiteflies that acquired the virus in 4–6 hr. required a further 4 hr. to become viruliferous, and could then infect in a 15 min. feeding period, though longer periods gave more infections. Adults remained infective for more than 48 hr. after ending their infection feed. Single viruliferous flies occasionally infected cassava. Cross-infestations with whiteflies gave no evidence that cassava mosaic and cotton leaf curl virus are related.

Weed fungi No. 6. Heleococcum aurantiacum. An uncommon weed fungus of Mushroom compost.—*Mushroom News* (W. Darlington & Sons, Ltd., Worthing, Sussex), **6**, 8, p. 326, 1958.

This fungus (*Bot Tidsskr.*, **37**, p. 417, 1922), recorded in England for the 1st time in 1935, is here recorded a 2nd time.

Wood (F. C.). **Verticillium brown spot disease.**—*Mushroom News* (W. Darlington & Sons, Ltd., Worthing, Sussex), **6**, 8, pp. 318–320, 4 fig., 1958.

An account in popular terms of the disease caused by *V. psalliotae*, favoured by high humidity, and its control [cf. **28**, p. 2; **34**, p. 435].

Storey (F. I.). **Mushroom speed-up and watery stipe.**—*Mushroom News* (W. Darlington & Sons, Ltd., Worthing, Sussex), **6**, 8, pp. 324–325, 1958.

'Watery stipe', which is accompanied by browning [cf. **37**, p. 628], is considered to be due to lack of sufficient ventilation to remove excess moisture and the waste products of metabolism, the latter being increased by the speeding up of growth now practised.

Morschell (J. R. G.). **Vine diseases on the Murrumbidgee Irrigation areas.**—*Agric. Gaz. N.S.W.*, **69**, 1, pp. 36–42, 1958.

A summary of spraying trials in 1950–55 to control black spot [*Elsinoe ampelina*] and downy mildew [*Plasmopara viticola*] on vine [cf. **36**, p. 570]. The following

applications are recommended as a result: thiram or ziram at 1½ lb./100 gal. at bud swell and bud burst for black spot, and ziram at 1½ lb. when the shoots are 8–9 in. long for black spot and downy mildew. The latter is then controlled by 4 or 5 applications of 10–5–10–100 Zn Bordeaux or 8–8–100 Bordeaux, reduced in the later sprays to 5–5–100, the applications being increased to 6 or 7 for vars. susceptible to *E. ampelina* also.

Savin (G.). **Cercetăre și observatii la stațiunea de avertizarea manei-Valea Călugărească.** [Researches and observations at the Valea Călugărească Station for downy mildew prevention.]—*Grădina, Via și Livada*, **7**, 6, pp. 52–57, 1958. [Russian, French, English, and German summaries issued separately.]

Notes on vine mildew (*Plasmopara viticola*) [**31**, p. 167] in the main vine-growing centre of Romania, Dealul Mare. Observations over 22 years have shown that the most favourable conditions for disease development occur in May, when primary infection occurs, June, and early July. Oospores germinate in April in some years before vine growth starts, and primary infections are reduced. The number of preventive Bordeaux treatments recommended ranged from 1–6.

Pine (T. S.). **Etiology of the dead-arm disease of Grapevines.**—*Phytopathology*, **48**, 4, pp. 192–197, 4 fig., 1958. [29 refs.]

Having reviewed earlier taxonomic studies, the author accepts the name *Phomopsis viticola* (Sacc.) Sacc. for the dead-arm disease pathogen. Perithecia of *Cryptosporella viticola* has not been reported in nature or in culture since Shear's original description (*Phytopathology*, **1**, pp. 116–119, 1911). Morphological and cultural investigations already reported in brief [**37**, pp. 131, 390] are described in more detail from the University of California, Davis.

[Andrews (F. W.) & Painter (A. C.).] **Abstracts and Index to the Annual Research Reports 1913–1953. East Malling Research Station.**—vi+175 pp., 1957.

This annotated index is followed by alphabetical lists of the common names of the pests and diseases mentioned, with the scientific names of the causal organisms. Cross references and brief outlines of the substance of the more important papers make this a most valuable record of the work of the Station.

Forty-seventh and Forty-eighth Annual Reports, 1956, 1957, John Innes Horticultural Institution.—47 pp., 1956; 47 pp., 1957.

In the 1st report W. Williams records that from apple vars. resistant to scab [*Venturia inaequalis*] segregates were isolated by A. G. Brown by means of seedling inoculation. One promising source was the open-pollinated progeny of Cox's Orange Pippin; 10 of 3,000 such seedlings developed only local necrosis with no subsequent infection and 19 others showed various degrees of resistance. As crosses involving resistant vars. such as Ontario, Antonowska, and Miller's Seedling gave only 0·5% resistant seedlings, equally good results could be expected from sieving large, open-pollinated populations of which only the female parent is known. Crosses of *Malus floribunda*, *M. hupehensis*, *M. sieboldii*, and *M. halliana* with cultivated vars. also gave resistant F_1 seedlings.

Resistance to mildew [*Podosphaera leucotricha*] has been discovered in segregates of cultivated vars. of *M. pumila*, seedlings of several wild spp., and all open-pollinated *M. hupehensis* and *M. florentina*.

Observations in the 2nd report on the occurrence of mildew in the field on 3,400 seedlings from crosses between 31 apple vars. indicate that resistance is a quantitative character. The relative mean resistance of families of given vars. corresponded closely irrespective of whether they were selfed or crossed, and can be estimated if the performance of the selfed progeny is known. Analysis of data by

N. Gilbert showed that Beauty of Bath and Lord Lambourne contributed most to the resistance of their progeny, while Merton Russet and Late Orange contributed the least. Kola (hybrid), James Grieve, Dabinett, and Annie Elizabeth gave high average resistance, the ability of Kola to transmit resistance being derived from the highly resistant *M. ionensis*.

Survey of parental breeding material of strawberries in 1956 yielded 15 unrelated clones resistant to the common strain of *Phytophthora fragariae*. H. Williams confirmed that the transmission of June yellows [see below] in the var. Blakemore was greater through pollen than through the egg cell, thus supporting the view that the condition was caused by a mutant or rogue plasmagene rather than by a deficiency.

Genetic studies of young asci of *V. inaequalis* by D. Day at the University of Wisconsin [**36**, p. 474] indicate that synapsis occurs between short chromosomes before maximum extension, segregation of certain colour mutants can be made visible in the ascus by fixing and staining, and the cells of vegetative mycelium, including tip cells, are uninucleate.

Fifth Annual Report, 1957–8, Scottish Horticultural Research Institute.—51 pp., 1 pl., 1 graph, 2 maps, 1958.

In the virology section (pp. 31–37) [cf. **37**, p. 200] C. H. Cadman states that tannic acid and an unidentified polyphenolic tannin from raspberry leaves [cf. **36**, p. 557] both combine irreversibly with some viruses, though with others the combination is readily reversed by dilution or increase in pH. Extracts from raspberry leaves containing raspberry ring spot [raspberry Scottish leaf curl virus: **37**, p. 669] or the beet ring spot strain of tomato black ring virus [**37**, p. 463], made with 2·5% nicotine base, contained less tannin and were usually more infective than those made with alumina or buffer solutions at pH 8. Both viruses were precipitated by acetone or ammonium sulphate from extracts of infected raspberry leaves with nicotine or alumina, and tomato black ring virus was detected serologically in preparations from infected raspberry leaves. Tomato black ring virus was readily transmitted by mechanical inoculation of infective sap from tobacco to peach and from peach to tobacco, but not from tobacco to raspberry. Peach leaf extracts appear to contain much less tannin than those from raspberry.

C. H. Cadman, B. D. Harrison, and R. M. Lister isolated raspberry Scottish leaf curl virus from Cambridge Vigour, Huxley, and Talisman strawberry plants, which were stunted and had crinkled leaves. The virus is thought to be present in the soil of many fields in E. and W. Scotland. It was also found in raspberry in Wiltshire, though the strain there differs from that in Scotland. Evidence was obtained that raspberry yellow dwarf virus occurs in the soil in Lanarkshire. The beet ring spot strain of tomato black ring virus, not previously found in raspberry, was isolated from Malling Exploit, Malling Seedling K, and Malling Seedling V. Peach [**37**, p. 149] and cherry became infected when grown in infested soil. Viruses resembling and possibly related to potato stem mottle virus [cf. **36**, p. 281, *et passim*] were isolated from potato, oats, sugar beet, and turnip and shown to be soil-borne.

A strain of cucumber mosaic virus isolated by B. D. Harrison from naturally infected Lloyd George raspberry was transmitted by *Amphorophora rubi* from *Datura stramonium* to black raspberry.

According to R. M. Lister, Redgauntlet and, especially, Talisman strawberries become severely stunted when infected by the viruses that cause yellow edge and crinkle in Royal Sovereign. More spread of aphid-borne viruses from diseased Cambridge Favourite to *Fragaria vesca* indicator plants occurred in early Oct. than in July or Aug.

C. H. Cadman reports that when individuals of *Myzus persicae* were fed for 4, 8,

or 16 hr. on *Physalis floridana* plants infected by potato leaf roll virus and transferred daily, until they died, to healthy plants both persistence of infectivity and frequency of transmission varied directly with the duration of the acquisition feed. B. D. Harrison found that strains of potato leaf roll virus causing mild and severe symptoms in *P. floridana* differed in the facility with which they were transmitted by *M. persicae*. Plants already infected by the avirulent strain did not develop additional symptoms after being infested with aphids carrying the virulent strain. Aphids which had transmitted the avirulent strain were able to acquire and transmit the virulent.

R. M. Lister observed that turnip yellow mosaic, turnip crinkle, and turnip rosette viruses are widespread in turnip and swede in E. Scotland. The first 2 produce no symptoms on swede, but on yellow turnip they cause, respectively, severe chlorosis and leaf crinkling. Swedes and turnips infected by turnip rosette virus are usually stunted and bear necrotic patches on the leaves. There was no significant difference in yield between healthy yellow turnips (var. Bruce) and plants artificially infected by local strains of the 3 viruses, singly and in all possible combinations, even though some combinations produced very severe leaf symptoms.

In the mycology section (pp. 38–40) W. R. Jarvis states that spores of *Botrytis cinerea* collected in a Hirst trap in a raspberry plantation were most numerous at midday, when the R.H. was 85–65% and falling rapidly. The peak concentrations were about 600–1,000 spores/cu.m. When night temperatures remained below 13° C. for long periods, few spores were trapped in the morning. The seasonal pattern of spore dispersal appeared to be related to the ripeness of the fruit. Before picking, spore concentration remained at 5–20/cu.m.; as the fruit ripened it rose rapidly with considerable fluctuation, and finally dropped as the crop was removed.

Under humid conditions only 1% of dry spores germinated on green strawberry fruits in 24 hr., as against 63% on ripe fruits. Over 60% of isolations from petals, fragments of straw, and other organic debris adhering to strawberry fruits yielded *B. cinerea*, but in a small experiment only 11% of the fruit was infected in strawed plots, as against 16% in the unstrawed. Viable sclerotia were found on 50% of the straws remaining from the previous season and on dead plant remains; the burning (or mowing) and removal of straw and plant debris after the fruit season is recommended. Viable sclerotia were found on about 1% of the canes in raspberry plantations but seldom on plant debris remaining on the soil surface after cultivation.

Further studies on the polyphenol metabolism of 3 races of *Phytophthora fragariae* showed that all utilized caffeic, chlorogenic, protocatechuic, and gallic acids, DL-tyrosine, D-catechin, and pyrocatechol at about 0·001 M, but cinammic and *m*-digallic acids and *p*-cresol inhibited growth. There were marked differences between the races in growth rate on most of the polyphenol substrates. Differences in intracellular activity were not associated with the differences in growth rate.

Isolations by A. R. Wilson and W. R. Jarvis from folded leaves of Brussels sprouts affected by a brown soft-rot usually yielded *B. cinerea* and/or one or more species of soft-rotting bacteria. Cultivars displayed wide differences in susceptibility.

In the report from Auchincruive (pp. 41–43) Isabel G. Montgomerie reports that each of 36 isolates of *P. fragariae* studied fell into 1 of 4 groups as determined by its ability to infect the indicator vars. used [**35**, p. 874]. Altogether, 573 plants (strawberry and *Fragaria* spp.) immune from attack by the Huxley race of *P. fragariae* [cf. **31**, p. 70] were found; many of these appear to be immune also from a 2nd race but all are susceptible to a 3rd, which infects Climax.

Further investigations by R. D. Reid, A. M. Sutherland, and K. C. McConnell confirmed that strawberry seedlings which produce chlorotic leaves may develop into plants with forms of leaf variegation distinct from June yellows [cf. **35**, p. 307].

Plants severely affected by authentic June yellows seem to produce higher proportions of yellowed seedlings than those less severely affected.

Åkerberg (E.). **Årsberättelse över Sveriges Utsädesföreningsverksamhet år 1957.** [Annual report of the Swedish Seed Association for the year 1957.]—*Sverig. Utsädesfören. Tidskr.*, **68**, 3, pp. 99–183, 1 graph, 1958.

The following items of phytopathological interest occur in this report [cf. **36**, p. 637]. The results of intensive studies at Svalöf on the control of wheat rusts indicate that success against stem rust [*Puccinia graminis*] is more likely to be achieved through breeding than by barberry eradication. Brown and yellow rusts [*P. triticina* and *P. glumarum*] are also probably controllable by breeding, though with greater difficulty. On the other hand, attempts to eliminate *P. graminis* from oats by selection have given very disappointing results, and barberry eradication is the only method of control. Breeding oats for resistance to crown rust [*P. coronata*] also presents difficulties, though the problem does not appear insoluble.

At the Övrenorrland branches of the Association winter rye was severely damaged by *Fusarium* [*Calonectria nivalis*] and *Typhula* spp. As usual, the elite varieties were mainly affected, while Norrbottens 'land' rye sustained the least injury. Brassicol super gave excellent control.

At the Kalmar stations, where potato blight (*Phytophthora* [*infestans*]) was exceptionally severe, the vars. Ackersegen, Anna, and Wohltmann yielded 12–37% more than Up-to-Date, while the yield of Bintje was 33% lower. In Jämtland the disease was most virulent on Early Puritan, Bintje, and Sv 42149, causing 26, 21, and 20% tuber rot, respectively.

An epiphytotic of clover rot (*Sclerotinia* [*trifoliorum*]) at Skara, Västgöta, permitted very important observations on resistance to be made. With the exception of Weibulls Rea, the tetraploid red varieties were uniformly superior to the diploid in this respect, and their yields roughly 69% higher. The new red tetraploid Svalöfs Uta (U036) merits special consideration, while Hermes, an improved descendant of Merkur, is an outstanding diploid. The commercial white clover vars. also sustained heavy damage, while the selections gave up to 50% higher yields. At Ultuna red clover stands were largely decimated by the disease, and here again 2 tetraploid vars., Ulva and BGT 49–14, gave prolific harvests.

Investigations 1955.—*Bull. Dep. Agric. Jamaica* (N.S.) 55, 106 pp., 1957. 3*s.* 6*d.*

Much of the information in the plant pathology section (pp. 25–32) of this report, by H. C. James [cf. **35**, p. 750], has already been noticed [**36**, p. 499; **37**, p. 7]. Sugar cane chlorotic streak virus caused up to 30% loss in B 37172 and B 4362. The manner of infection is unknown, but is not mechanical (by cane knives) and apparently there is an insect vector.

Cigar end disease (*Stachylidium* [*Verticillium*] *theobromae*) was observed for the first time, on Cavendish banana near Newcastle. Severe mosaic virus [unspecified] was widespread on mustard and cabbage, and a severe outbreak of rust (*Phakopsora desmium*) was noted on experimental cotton. Copper oxychloride (as coppesan, 0·125% Cu) gave the best control of potato blight (*Phytophthora infestans*), the incidence of which, however, was low owing to climatic conditions.

Annual Report of the Agricultural Experiment Stations, Florida, for the year ending June 30, 1957.—397 pp., 39 fig., 8 graphs, [? 1958].

In the report from the Plant Pathology section (pp. 125–131) [cf. **36**, p. 808] C. W. Anderson states that *Myzus persicae* readily transmitted blackeye cowpea mosaic virus [strain of cowpea mosaic virus: **35**, p. 263]. Preliminary tests indicated that all cowpea viruses except the strain of cucumber mosaic are immunologically related. *Cassia tora* reacted with local lesions and *Indigofera hirsuta* with mottle to all strains of cowpea mosaic virus.

J. R. Large reports that the 3 best treatments tested against scab (*Cladosporium effusum*) [cf. **36**, p. 805] on Mahan pecan were a dormant application of puratized agricultural spray (P.A.S.), followed by (1) 5 applications of P.A.S.+glyodin+lime or (2) Bordeaux in the 1st 2 summer applications, ziram +¼% summer oil in 3 and 5, or (3) 5 applications of P.A.S.

Of the soil fungicides tested by H. N. Miller in nursery plots the most effective against *Pythium* root rot of Chinese evergreen [*Aglaonema modestum*] was vapam at 109 gal./acre, while crag mylone (300 lb.) gave the best control of *Rhizoctonia* root rot of *Philodendron*.

In a survey of Florida and S. Georgia P. Decker and S. A. Ostazeski found that virus diseases of yellow lupin [*Lupinus luteus*] are still the most important factor limiting production [cf. **37**, p. 483]. Powdery mildew (*Erysiphe* sp.) and root rots were important on yellow and blue lupins [*L. angustifolius*]; isolates from affected roots of both were predominantly *Rhizoctonia* and *Fusarium* spp., but in limited tests only *R.* spp. were pathogenic to blue lupin seedlings. Small amounts of brown spot (*Pleiochaeta setosa*) were present on yellow lupin in W. Florida.

M. K. Corbett and C. W. Anderson state that a virus from a *Cattleya* orchid with black, necrotic streaks and sunken, ring-like patterns on the leaves induced necrotic, local lesions on *Datura stramonium* and is presumably a strain of [orchid] (*Cymbidium*) mosaic virus [cf. **36**, p. 701]; *Cassia occidentalis* is a useful local-lesion host.

H. H. Luke found a race of *Puccinia coronata*, tentatively identified as 276 [**37**, p. 405], in N. Florida, causing considerable damage to the most important oat vars. All commercial (hexaploid) oats are known to be susceptible but several lines of irradiated material carried resistance. Certain oat selections that held promise for central Florida were found to be susceptible to grey speck due to Mn deficiency [cf. **34**, p. 593]; 300 lb. $MnSO_4$/acre alleviated the condition in Ab 250 and Ab 247. A newly released rye, Gator, is highly resistant to leaf rust [*P. dispersa*] and mildew [*Erysiphe graminis*].

T. E. Freeman reports on three new turf diseases, including a dwarfing and fasciation of Bahia grass [*Paspalum notatum*] caused by *Myriogenospora paspali*.

From the Central Florida Station (pp. 177–187) J. F. Darby and J. W. Wilson state that in a field trial 11 applications of maneb (1·5 lb./100 gal.), cop-o-zinc (3 lb.), thioneb (1·5 lb.), or maneb-cop-o-zinc (1:2 lb.) gave excellent control of *Pseudoperonospora cubensis* [cf. **36**, p. 806] on cantaloupe melons. Submerging cantaloupe fruits in a solution containing tribasic copper sulphate (3 lb./100 gal.) and streptomycin sulphate (100 p.p.m.) reduced the percentage rotted by *Pellicularia* [*Sclerotium*] *rolfsii* and an undetermined soft rot bacterium from 49·1 in the untreated to 21·2, after 3 days at room temp. Painting the stem scars with a paste containing the same mixture at 50 lb.: 1,000 p.p.m.+corn starch reduced the percentage to 20·7 but caused slight injury.

At the Citrus Station (pp. 188–243) J. J. McBride found that on Valencia orange leaves the initial residues of kelthane (α-trichloro-methyl-p, p'dichlorobenzhydrol) from a spray containing 1·5 lb. (25% wettable powder)/100 gal. averaged 0·2 μg./sq. cm. In 48 hr. there was no significant loss of residue which, however, fell to 0·1 μg. 10 days after application, 2·7 in. of rain being recorded in the last 3 days. When zineb was applied in May to seedling oranges at 1 lb. (65% wettable powder)/100 gal. with a pressure sprayer, the initial deposit averaged 2·4 μg./sq. cm., falling after 4 days without rain to 2 μg. After 1·2 in. of rain on the 7th day 0·2 μg. remained on the 8th. There was no detectable deposit after 14 days during which 2·1 in. of rain fell.

By indexing to Key lime L. C. Knorr and W. C. Price showed that a sudden decline of adult citrus trees on the E. Coast was not caused by tristeza virus. Of 161 tolerant citrus trees growing on the Ridge, assayed at random, 16% contained

tristeza [**36**, p. 643]. Other citrus diseases investigated by indexing were Cleo collapse, characterized by a rapid decline of the top and a xyloporosis-like pitting of the rootstock portion of the trunk; a growth retardation and bark shelling in trees on Rangpur lime [cf. **36**, p. 317]; Valencia variegation, a chlorotic leaf pattern similar to that produced in wood pocket of lemon foliage [**37**, p. 659]; lemon-leaf twist; S-twigging in Valencia oranges; endocarp blueing in Valencias; sphaeropsoid knot, a tuberous malformation on lime trees, resembling the galls caused by *Sphaeropsis tumefaciens* [cf. **30**, p. 309]; and Cirunelo channelling, a disease resembling stem-pitting, which affects the inner face of the bark of trunks of this variety. None of these was related to tristeza.

The vein-clearing of *Citrus medica* var. *etrog* reported in Australia and Ghana to be caused by tristeza virus failed to develop with any of the Florida sources of the virus tested. Many grapefruit trees in Florida were found to carry tristeza virus without symptoms of stem-pitting [**36**, p. 99].

E. F. Hopkins and A. A. McCornack report that the average control of post-harvest decay (almost all of which was due to stem-end rot [*Diplodia natalensis* and *Diaporthe citri*] and blue-green mould [*Penicillium italicum* and *P. digitatum*: **37**, p. 535]) in 4 orange vars. dipped in dowicide A-hexamine and packed with diphenyl pads was 92% and 96% after 2 weeks' storage at 70° and 60° F., respectively (88 and 96 after 3 weeks). A commercial non-buffing water-wax emulsion, 'primafresh' (Johnson Wax Company, Racine, Wisconsin), containing 1% dowicide A+0·5% hexamine+0·2% sodium hydroxide imparted a high and lasting gloss when applied to oranges; decay control was 70% after 2 weeks at 70° and 86% at 60°. When ammonia treatment of unwashed oranges was combined with ethylene de-greening, 150 g. ammonium carbonate/50 cu. ft. being used in the de-greening chambers, peel injury was virtually nil and decay control was 97, 84, and 67%, respectively, after 1, 2, and 3 weeks' storage at 70°. Valencia oranges intended for the preparation of chilled juice were dipped, unwashed, on the day of picking, in dowicide A-hexamine and waxed without rinsing. Average decay control after 12 weeks at 40°+7 days at 70° was 89% and the juice was excellent.

At the Everglades Station (pp. 244–292), J. N. Simons conducted further work on the use of barrier crops to protect vegetable fields from infection by aphid-borne, non-persistent viruses [cf. **36**, p. 568]. A single-row barrier 1·5 ft. high was almost as effective as one of 10 ft. The most effective barrier is a 50 ft. wide strip of a non-susceptible crop treated weekly with parathion. Solution-grown [capsicum] peppers given inadequate amounts of Mn, as indicated by visible deficiency symptoms and the accumulation of inorganic N, contained less potato virus Y (measured by transmission by *Myzus persicae* [**37**, p. 692]) than plants receiving adequate Mn. Immature leaves of the Mn-deficient plants yielded considerably less virus than similar leaves from the non-deficient plants. Titres in mature leaves were similar, irrespective of Mn treatment.

R. S. Cox, D. S. Harrison, and F. E. Van Nostran showed that control of maize leaf blight (*Helminthosporium turcicum*) was improved by using 2 nozzles over the row rather than 1, with 3 drop nozzles on each side, and by increasing the volume from 60 to 250 gal./acre. Parzate appeared to be more effective than dithane Z-78.

R. S. Cox and F. E. Van Nostran ascertained that a total of 1,420 lesions on celery leaves yielded both *Pseudomonas apii* and *Cercospora apii* from the same lesion; *P. apii* was found in 86·5% and *C. apii* in 44·5%, nearly always in company with the bacterium. In duplicate field trials by R. S. Cox dyrene and copper mixtures gave the best control of *C. apii* and *Rhizoctonia* sore shin of celery. The same writer and J. P. Winfree found that zineb and nabam+zinc sulphate effectively controlled *Mycosphaerella fragariae* on strawberry.

At the Plantation Field Laboratory W. D. Moore and R. A. Elliston found that

vapam, pentachloronitrobenzene, and a combination of 36% PCNB+25% captan significantly reduced post-emergence damping-off of beans [*Phaseolus vulgaris*] due to *Pythium* and stem lesions caused by *Rhizoctonia* and *Pythium*. Surface applications of the PCNB-captan combination after sowing greatly increased stands of capsicum. Addition of hay to inoculated, sterilized soil in pots significantly reduced infection of beans by *Rhizoctonia* and *Pythium*, while bagasse gave even better results; in the field the effect was cumultative, a 2-yr. treatment being better than a 1-yr.

At the Gulf Coast Station (pp. 293–319) C. M. Geraldson showed that when $\frac{2}{3}$ of the Ca in a nutrient culture was replaced by equivalent amounts of NH_4, Mg, K, or Na, the most severe blossom-end rot of tomato plants [cf. **36**, p. 631] was associated with a high NH_4:Ca ratio.

In experiments by R. O. Magie a thimerosal dip controlled *Fusarium oxysporum* f. *gladioli* and *Curvularia trifolii* [cf. **37**, p. 482] on gladiolus corms. No treatment was more than 50% effective in curing Spotlight and Picardy corms inoculated after harvest with *F.o.* f. *gladioli*. Removal of the husks from Picardy and June Bells corms 2 weeks before planting doubled flower production and gave more corms compared with the standard treatment with N.I. ceresan; many *F.* infections appear to be carried in the husks and cores. Spraying or dusting the tight flower-buds or dipping the spikes after harvest controlled petal infection by *Botrytis gladiolorum* [cf. **36**, p. 588] even when the petals were inoculated 2–7 days after treatment. One or 2 sprays/week of dyrene ($1\frac{1}{2}$/100) gave excellent protection to var. Florence Nightingale against *Stemphylium* leaf spot [cf. **35**, p. 526].

G. Sowell, on the W. coast, found that *Colletotrichum lagenarium* and *P. aphanidermatum* on cucumber [cf. **36**, p. 299] were best controlled by maneb+thylate (65%) at 3 lb./acre. Experimental evidence indicated that tomato growers cannot depend on systemic protection against *Xanthomonas vesicatoria* for more than a few days after the last application of streptomycin, but the efficacy of this material at 500 p.p.m. was significantly improved by the addition of 622 p.p.m. copper.

Reporting from the Sub-tropical Station (pp. 340–358), G. D. Ruehle and T. W. Young state that S at 8 lb. and karathane at 1 lb./100 gal. were both effective against *Oidium* sp. on mango flowers in a block of mature Zill trees when applied after the disease appeared but before it became epidemic.

R. A. Conover states that of the eradicants tested against *Uromyces phaseoli typica* [*U. appendiculatus*] on bean [*Phaseolus vulgaris*] the best were maneb applied twice weekly and CP 10512 weekly.

L. A. McFadden observed a serious disease of *Dieffenbachia picta* and related varieties in greenhouses in southern Florida. Twelve isolates of an unidentified bacterium from stem lesions all proved pathogenic upon inoculation. The leaves of affected plants are pale green and successively smaller. High temperature and humidity appear to favour the disease.

In S. Florida *Phytophthora* leaf spot of *Philodendron oxycardium* was troublesome in spring. *Phytophthora* spp. also attacked *Peperomia obtusifolia*, *Spathiphyllum* sp., and *Cattleya*. Other diseases affecting ornamentals included stalk rot (*Aspergillus niger*) of *Sansevieria laurentii*, [unspecified] anthracnose leaf spot of coco-nut palm and *Caryota* spp., and butt-rot of *Phoenix sylvestris* and *Pseudophoenix sargenti*, probably caused by *Ganoderma* sp. The most serious diseases of cut flowers included *Ascochyta chrysanthemi* [cf. **35**, p. 878; **37**, p. 134] on chrysanthemum and snapdragon [*Antirrhinum*] blight (*Phyllosticta antirrhini*).

At the Potato Investigations Laboratory, A. H. Eddins and D. L. Myhre (pp. 375–376) found that soil infested with corky ringspot [spraing] had a pH of 4·54 and a K_2O content of 293 lb./acre while non-infested had pH 6·25 and 177 lb. Severity increased with rise in soil moisture content.

Dalzell (R. C.). **Physiological and serological studies of members of Erwinia, Escherichia, and Aerobacter.**—*Diss. Abstr.*, **27**, 12, pp. 2765–2766, 1957.

The conclusions drawn from these studies at Pennsylvania University are that *E. coli*, *A. cloacae*, *Erwinia amylovora*, and *E. tracheiphila* have a common 'S' phase, from which the 'M' phase of any of the 4 species may arise; this is probably true for all the members of the 3 genera.

Linden (G.) & Schicke (P.). **Untersuchungen über die fungizide und herbizide Wirkungen von Vapam im Boden unter Berücksichtigung von Eindringtiefe, Adsorption und Karenzzeit.** [Studies on the fungicidal and herbicidal action of vapam in the soil in respect to depth of penetration, adsorption and 'waiting-time'.]—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 399–418, 5 graphs, 1957. [English summary.]

At the scientific division of C. H. Boehringer Sohn, Ingelheim/Rhein, Germany, vapam [**36**, p. 348] applied at 100 ml./sq. m. by drenching, mixing in, and injection to soil contained in glass cylinders inoculated with *Fusarium* sp., *F. oxysporum* f. *dianthi* and f. *melonis*, *Penicillium* sp., *Phoma betae*, *Pythium ultimum*, and *Rhizoctonia* [*Corticium*] *solani* satisfactorily eliminated them, as determined by re-isolation tests. Drenches are limited to the upper layers of soil, not penetrating below 20 cm. even when the soil is dry. Lettuce is particularly susceptible to vapam and could be used as an indicator of vapam residues. Field applications should be made not later than October for March sowing of sensitive plants.

Gould (S. W.). **Punched cards, binomial names and numbers.**—*Amer. J. Bot.*, **45**, 4, pp. 331–339, 1958.

A description and explanation from Opening Hill Road, Madison, Conn., of a punched card system for the codification of the names of plants and animals which, it is claimed, will not interfere with the making of or changes in taxonomic judgments.

Each genus would have a 5-digit number, preceded by group numbers and followed by species and subspecies numbers (in chronological order). All fungal genera would start with the digit 7.

Microbial Ecology. Seventh symposium of the Society for General Microbiology, held at the Royal Institution, London, April 1957.—viii+388 pp., 6 pl., 4 fig., 15 graphs, 2 maps, Cambridge, The University Press, 1957. 32*s.* 6*d.*

The 17 papers in this volume cover those effects of environment that can be studied by physical and chemical methods; the effects of interactions between microbes; the methods of survival of fungi and protozoa in nature; and the effect of higher organisms on microbial survival and distribution. They include contributions (each with a comprehensive bibliography) by P. W. Brian (pp. 168–188) on the ecological significance of antibiotic production; C. L. Duddington (pp. 218–237) on predacious fungi and their place in microbial ecology; Lilian E. Hawker (pp. 238–258) on ecological factors and the survival of fungi; H. T. Tribe (pp. 287–298) on the ecology of micro-organisms in soils, as observed during their development upon buried cellulose film; F. C. Bawden (pp. 299–314) on the role of plant hosts in microbial ecology; and K. M. Smith (pp. 364–388) on some factors influencing the spread of plant viruses by arthropod vectors.

Tribe used pieces of P.T. 300 sheet cellophane (British Cellophane Company), 1×0·5 cm., boiled and then washed in distilled water; they were placed singly on $\frac{7}{8}$ in. square cover-slips, drained, and the slips buried vertically in pots of 6 different soils, including leaf litter. The soil was watered to 60% of its moisture-holding capacity and then allowed to dry out to 30–40% at laboratory temp. before

re-watering to 60%; this cycle lasted 2–4 days. After examination and selection of pieces for isolation and culturing the slips were stained in picronigrosin-lactophenol.

Decomposition, followed to an advanced stage, was similar in all the soil types. A fungal phase lasting 1–10 weeks was followed by a bacterial phase which continued indefinitely. Thin sections of other materials might be used in the same way.

Cooke (W. B.). **The ecology of the fungi.**—*Bot. Rev.*, **24**, 6, pp. 341–429, 1958. [498 refs.]

This exhaustive survey includes sections on the fungi of soil, water, air, perishable commodities, dung and sewage [cf. **37**, p. 76], burned areas, living plants and animals, and on cultural techniques.

Dold (H.). **Vital-Inhibition, demonstriert am jahreszeitlichen Verhalten von Phytomyceten und Phytophagen.** [Vital inhibition demonstrated by the seasonal behaviour of phytomycetes and phytophages.]—*Zbl. Bakt.*, Abt. 1 (*Orig.*), **168**, 3–4, pp. 298–303, 6 fig., 1957. [English, French, and Russian summaries.]

Further examples are given in support of the author's thesis that the fungi and viruses deposited on the leaves of trees and shrubs during the spring remain latent until the late summer and autumn (*Zbl. Bakt.*, Abt. 1 (*Orig.*), **155**, p. 106, 1950; **160**, p. 217, 1953). With the decrease in assimilative processes accompanying reduced vitality at that period the pathogens begin to multiply, producing spots and necroses.

Sreeramulu (T.). **Effect of mowing grass on the concentrations of certain constituents of the air spora.**—*Curr. Sci.*, **27**, 2, pp. 61–63, 1 graph, 1958.

Studies at the Imperial College Field Station, Sunninghill, Berks., on the aerial dissemination of barley loose smut [*Ustilago nuda*], using a Hirst spore trap [cf. **31**, p. 618] with a suction rate of 10 l./min. at 35 in. above ground level showed that mowing grass around the barley increased other plant pathogens in the air for a short period. The changes in the concentrations of *Cladosporium*, *Epicoccum*, and *Alternaria* [cf. **37**, pp. 10, 142], together with the hourly changes in weather conditions from 19–24 July 1955, are presented. *C.*, *E.*, and *A.* showed about 5, 4, and 4 times higher concentrations, respectively, while grass was mown for 2 hr.; the 1st 2 had returned to their previous concentration by the next day, whereas *A.* took about 2 days to do this.

Sievers (E.). **Zur Ökologie und Morphologie der endotrophen phycomycetoiden Mycorrhizen.** [On the ecology and morphology of the endotrophic phycomycetous mycorrhiza.]—*Arch. Mikrobiol.*, **29**, 2, pp. 101–107, 3 fig., 1958.

A re-examination in 1953 at the Lehr- u. Forschungsanstalt für Wein-, Obst- u. Gartenbau, Geisenheim, Germany, of material, including leek roots, collected in Italy [cf. **4**, p. 755], revealed the occurrence of typical vesicles. From the available data it seems reasonable to assume that all the endotrophic, phycomycetous mycorrhiza with thamniscophagy hitherto investigated are produced by the same fungus. Cultures were unobtainable, but the hypothesis was supported by a test in pure quartz sand in which both the thamniscophagous mycorrhiza from leek and the tolypophagous one from *Colchicum autumnale* were transmitted to onion, wheat, oats, and *Solanum demissum*, and vice versa [cf. **33**, p. 372 *et passim*].

Harley (J. L.) & Jennings (D. H.). **The effect of sugars on the respiratory response of Beech mycorrhizas to salts.**—*Proc. roy. Soc.*, Ser. B, **148**, pp. 403–418, 16 graphs, 1958.

On the basis of this study at Oxford University [cf. **35**, p. 839 *et passim*] the hypothesis is proposed that the respiratory effects of both sugars and salts may involve the consumption of high energy phosphate.

Foster (J. W.). **An evaluation of the role of molds in the comparative biochemistry of carbohydrate oxidation.**—*Tex. Rep. Biol. Med.*, **16**, 1, pp. 79–100, 13 diag., 1958. [63 refs.]

The species used to illustrate this critical discussion of recent biochemical literature include *Aspergillus niger*, *A. fumigatus*, *A. terreus*, *Penicillium chrysogenum*, and *Mucor* [*Rhizopus*] *stolonifer*.

Husain (A.). **Production of cellulolytic enzymes by Sclerotium rolfsii.**—*Phytopathology*, **48**, 6, pp. 338–340, 3 graphs, 1958.

At N. Carolina State College, Raleigh, when *S. rolfsii* from groundnut was cultured in modified Richards' solution cellulase (Cx) [**30**, p. 115] activity was greater in culture filtrates of media containing carboxymethylcellulose or filter-paper pulp than in those with dextrose as a C source. Strips of filter paper in a nutrient medium were disintegrated by the fungus in 2 weeks. The Cx enzyme was also demonstrated in young inoculated tomato fruits. These results indicate that the cellulase produced by *S. rolfsii*, in addition to pectic enzymes [**22**, p. 154], is probably involved in the breakdown of the host cell walls.

Lyr (H.). **Über den Nachweis von Oxydasen und Peroxydasen bei höheren Pilzen und die Bedeutung dieser Enzyme für die Bavendamm-Reaktion.** [On the demonstration of oxidases and peroxidases in higher fungi and the significance of these enzymes for the Bavendamm reaction.]—*Planta*, **50**, 4, pp. 359–370, 5 fig., 1958.

On the basis of further studies at the Institut für Forstbotanik, Eberswalde, Germany [**36**, p. 224 and below], it is proposed to modify the conditions of the Bavendamm reaction [**8**, p. 281] by substituting 0·08–0·1% tannin for 0·5% of the same product or gallic acid, the former being preferred on account of the more uniform results.

Test procedures are described for laccase, peroxidase, and tyrosinase which permit the differential demonstration of these enzymes in normally developed mycelia. Tyrosinase occurs in both white and brown rot wood-destroying fungi and is not related to their capacity for lignin disorganization. It is not responsible for the positive Bavendamm reaction, which is due almost exclusively to laccase.

Lyr (H.). **Die Induktion der Laccase-Bildung bei Collybia velutipes Curt.** [The induction of laccase production by *Collybia velutipes* Curt.]—*Arch. Mikrobiol.*, **28**, 3, pp. 310–324, 5 fig., 7 graphs, 1958.

Among the chemicals tested for their ability to induce laccase [cf. above] production by *Collybia velutipes* on α-naphthol-malt agar, pentachlorophenol was the most effective. Its max. activity was at 2×10^{-4} M and was enhanced by the simultaneous addition of 0·2% asparagine. Glucose tended to depress production.

Schwarze (P.) & Frandsen (N. O.). **Beobachtungen über den Trytophanabbau durch Pilze.** [Observations on the degradation of tryptophane by fungi.]—*Planta*, **50**, 4, pp. 353–358, 2 fig., 1 diag., 1958.

At the Max-Planck-Institut für Züchtungsforschung, Köln-Vogelsang, Germany, the author demonstrated by paper-chromatographic methods that *Penicillium notatum* (used in most of the tests), *P. digitatum*, *Cercospora beticola*, *Alternaria solani*, and *A. porri* could assimilate tryptophane added to Czapek-Dox medium either as the sole N source or combined with nitrate. The different transformation products formed coloured complexes with Ehrlich's reagent (ninhydrin and nitrite with naphthylamine).

Berk (S.), Ebert (Helen), & Teitell (L.). **Utilization of plasticizers and related organic compounds by fungi.**—*Industr. Engng Chem.*, **49**, 7, pp. 1115–1124, 1 fig., 3 graphs, 1958. [20 refs.]

At the Pitman–Dunn Laboratories, Frankford Arsenal, Philadelphia, 24 spp. of moulds utilized all the aliphatic dibasic acids in the homologous series from oxalic to sebacic except the first (pimelic and suberic were not tested) as C sources. Growth also occurred with all the diesters of the saturated, aliphatic dibasic acids tested containing 12 or more C atoms [cf. **29**, p. 43; **34**, p. 387, *et passim*].

The ability of the *l*-methyl and normal alkyl adipates to support growth increased parallel with molecular weight. In a series of dihexyl adipates the normal hexyl proved superior as a C source to the branched-chain isomers.

Of the diols tested, the unbranched with hydroxyl groups on adjacent or the end C atoms were the most freely utilized. The introduction of an ether linkage considerably reduced serviceability of polyglycols as a C source.

Good visual growth on 90 ester-type plasticizers was produced by *Paecilomyces varioti*, *Trichoderma* sp., *Aspergillus flavus*, *Penicillium funiculosum*, *A. ustus*, and *A. terreus*.

Schwinghamer (E. A.). **The relation of survival to radiation dose in rust fungi.**—*Radiation Res.*, **8**, 4, pp. 320–343, 1 fig., 10 graphs, 1958.

Further studies at Brookhaven National Laboratory, Upton, New York, were concerned with the survival of the rusts already enumerated [**36**, p. 340] after exposure to X- and γ-rays, fast and thermal neutrons, and ultra-violet (UV) light.

The sensitivity of the uredospores to X- and γ-rays and UV treatment was markedly affected by their water content, as controlled by the atmospheric humidity during irradiation. It was relatively constant at levels of 52% (ca. 45% water content) or less, but increased sharply at higher ones, being doubled at 98% (70% water content). The X-ray sensitivity of the hyphae of *Melampsora lini* (race 1) in the host was approximately 20 and 10 times that of uredospores irradiated at the 52 and 98% levels, respectively.

Sigmoidal survival curves were obtained for all the species for the 5 treatments. The uredospores of *M. lini* were noticeably more radio-sensitive than those of *P. graminis* [**11**, p. 166] (race 15B from wheat and 7A from oats) and *P. coronata* (race 57). For spores exposed to X- and γ-rays and neutrons the calculated sensitivity of *M. lini* was about twice that of *P. graminis* (wheat), whereas for UV the sensitivity ratio of the 2 species approximated to 10:1.

The minimum number of 'targets' or sensitive sites/spore was determined as 4 for *M. lini* and 2 for wheat stem rust. Inactivation by X- and γ-rays indicated the existence of a 2nd system of numerous sensitive units which contributed to lethality, mainly at high dose levels.

Sinha (A. K.). **Effect of glucose concentration on growth of certain Basidiomycetes.**—*Indian J. mycol. Res.*, **2**, 1–2, pp. 78–79, 1956. [Received Aug. 1958.]

A note from the Government College, Darjeeling, on the effect of concs. of glucose from 1–5% on the growth of *Polystictus xanthopus* (4% opt.), and *P. sanguineus* and *Trametes persoonii* (3%).

Campbell (R. N.). **Nutrient requirements for the production of perithecia by Ceratocystis variospora and other species.**—*Amer. J. Bot.*, **45**, 4, pp. 263–270, 4 fig., 1958.

At the Forest Products Laboratory, Madison, Wisconsin, *C. variospora* isolated from perithecia in sapwood of a northern pin oak stump formed few perithecia on either asparagine or calcium nitrate, but they developed abundantly with mixtures of these (total N 0·636 g./l.) when the organic : inorganic N ratio was 1 : 3. Perithecia

were most abundant on media with initial pH of 4·5–6·5 and on soluble starch and maltose media, and nearly as abundant on fructose, sucrose, or glucose. Thiamine was necessary for growth and perithecia. Other spp., *C. pluriannulata*, *C. piceae*, *C. pilifera*, and *C. ips*, produced more perithecia on the asparagine-nitrate medium than with either alone but *C. coerulescens* did not.

Betina (V.). **Diffusions-Plattenmethode zur Feststellung der fungistatischen Wirksamkeit der Antibiotika.** [Diffusion plate method for the determination of the fungistatic activity of antibiotics.]—*Naturwissenschaften*, **45**, 14, p. 342, 1958.

Details are given of a method developed at the Slowakische Technische Hochschule, Bratislava, involving the substitution of mycelium for spores for the assay of antibiotics. In tests with mycelium inhibition zones were formed in 18–24 hr., compared with 48 for spores.

Gould (C. J.). **The use of tiles for studies on soil-borne fungi.**—*Plant Dis. Reptr*, **42**, 6, pp. 811–813, 3 fig., 1958.

At the Western Washington Experiment Station, Puyallup, concrete sewer pipes of the 'belled' type, inside diam. 30 in., sunk 18 in. into the soil in double rows 2 ft. apart, covered with wire screens and the surrounding soil covered by a layer of sawdust, have proved useful, particularly for the study of bulb and corm diseases, and in field studies on longevity of soil-borne pathogens in different soils, effect of temperature on disease development, relation of fertilizers to infection, effect of bulb treatments on the control of certain pathogens which should not be allowed to spread in the field, and testing fungicides.

Stepanova (Mme L. N.) & Fish (E. M.). О токсичных бактериях в дерново-подзолистых почвах. [On toxic bacteria in turf-podsol soils.]—*Bull. Acad. Sci. U.S.S.R.*, Ser. Biol., **23**, 5, pp. 361–368, 7 fig., 1958. [English summary.]

At the Agrochemical Laboratory, Agrobiological Station, Moscow University, of 142 cultures of bacteria isolated from slightly cultivated ploughed turf podsol, 42 inhibited wheat seedlings, particularly the development of the root system. Most of the toxic ones were sporogenous. Among those particularly abundant was *Pseudomonas fluorescens*.

Systematic application of N fertilizers to an acid podsol increased the toxic bacteria, while manure with lime, especially when plus complete mineral fertilizers, reduced them.

Apinis (A. E.). **Distribution of microfungi in soil profiles of certain alluvial grasslands.**—*Angew. PflSoziol.*, **15**, pp. 83–90, 1958.

In this paper, presented at the International Symposium of Plant Sociology and Soil Science, Stolgenau/Weser, Sept. 1956, the results of a 3-year study of the fungal population (153 spp.) in dry pasture soil profiles in the flood plain of the river Trent, Notts., are tabulated. They differed from Warcup's findings [**30**, p. 580] in the greater number of spp., the most common ones being mainly different from those Warcup found.

Sterilization of seed bed soil.—*Agric. Gaz., N.S.W.*, **69**, 4, pp. 195–198, 2 fig., 1958.

A popular account of heat and chemical soil sterilization methods, including baking, steaming (spike-harrow and buried drain-tile systems), hot water, and surface burning procedure, and formalin, chloropicrin, and methyl bromide treatments.

Ishizawa (S.), Suzuki (T.), Sato (O.), & Toyoda (H.). **Studies on microbial population in the rhizosphere of higher plants with special reference to the method of study.**—*Soil Plant Food*, **3**, 2, pp. 85–94, 1957. [63 refs.]

In studies at the National Institute of Agricultural Sciences, Tokyo, of rhizospheres

[cf. **37**, p. 762] of barley, timothy [*Phleum pratense*], and lucerne, roots, with superfluous soil removed, were immersed in 3 successive changes of water and the resultant samples (the rhizosphere soil; that more intimately held by the root; and the root with some traces of soil still attached) analysed separately. Of the groups of micro-organisms in the rhizosphere, fungi predominated in *P. pratense* and were least in lucerne. Cutting the aerial part of the plant modified the rhizosphere microflora, especially on the root surface, the fungi being stimulated both in *P. pratense* and lucerne. The ratios A/T.B. (actinomycetes/total bacteria by plate count), anaerobes/T.B., and D.B. (dye-tolerant bacteria)/T.B. varied among the 3 samples from each plant, the root surface being characterized by low A/T.B. and high D.B./T.B. ratios, though these altered with plant growth. The importance in these studies of the ratio of the amount of soil/weight of root is emphasized.

Batista (A. C.) & Vital (A. F.). **Contribuïção ao estudo dos fungos Sphaeropsidales.** [Contribution to the study of Sphaeropsidales fungi.]—*An. Soc. Biol. Pernambuco*, **15**, 2, pp. 413–427, 11 fig., 1957. [English summary.]

This paper from the University of Recife, Brazil, includes descriptions of: *Rhabdospora oleandri* on oleander from Madeira, and *Sirodothis citri* sp. nov. in association with *Microxyphium aciculiforme* on citrus, and *Sirosperma eryobotryae* on *Eryobotrya japonica*, both from Florida.

Batista (A. C.) & Vital (A. F.). **Novas diagnoses de fungos Dematiaceae.** [New diagnoses of Dematiaceae fungi.]—*An. Soc. Biol. Pernambuco*, **15**, 2, pp. 373–397, 18 fig., 1957. [English summary.]

Following an examination of fungi from European and N. American herbaria at the University of Recife, Brazil, the authors describe a number of Dematiaceae including *Cordella myristicae* sp. nov. on nutmeg from Hope Gardens, Jamaica, *Dendryphion cephalicum* sp. nov. on *Rhododendron hirsutum* from Bavaria, *D. leguminosarum* sp. nov. on *Cassia grandis* from El Salvador, *Sarcinella acalyphae* on *Spondias purpurea* from Guatemala, *S. heterospora* on privet from Zürich, *Septonema perseae* sp. nov. on avocado pear from the Botanical Gardens, Brooksville, U.S.A., *S. toruloideum* on sapodilla from Salvador-Bahia, *Septosporium brasiliensis* sp. nov. on orange from Recife, and *Stachybotrys cannae* sp. nov. on *Canna* spp. from Puerto Rico.

Joshi (N. C.). **Fungi of Ajmer (Rajasthan)—1.**—*Indian J. mycol. Res.*, **2**, 1–2, pp. 65–70, 1956. [Received Aug. 1958.]

A list of 55 pathogenic and non-pathogenic fungi and their hosts, including a number of economic plants, recorded for the first time in Ajmer, India.

Banerjee (S.) & Samadder (K. R.). **Host-range and distribution of Daedalea flavida Lév.**—*Indian J. mycol. Res.*, **2**, 1–2, pp. 76–77, 1 map, 1956. [Received Aug. 1958.]

The world distribution and 33 hosts of *D. flavida* [cf. **34**, p. 619] are recorded from the Dept of Botany, Calcutta University.

Banerjee (S.) & Sarkar (A.). **Formation of sporophores of Ganoderma lucidum (Leyss.) Karst. and Ganoderma applanatum (Pers.) Pat. in culture.**—*Indian J. mycol. Res.*, **2**, 1–2, pp. 80–82, 1 pl., 1956. [Received Aug. 1958.]

At the Calcutta University College of Science fructifications of *G. lucidum* were produced on water-soaked blocks of *Casuarina equisetifolia* kept at 30–33° C. in darkness. In some 10–11 weeks, when fruit bodies had begun to form, these were exposed to dripping water, and developed to typical dimensions. Mango wood was used similarly for *G. applanatum*, which fruited more quickly.

Kanchaveli (L. A.), Natsvlishvili (A. A.), & Gvritishvili (M. N.). Материалы по микофлоре Мтатушети (Горная Тушетия). [Materials on the fungal flora in Mtatusheti (Upper Tusheti).]

Melya (M. S.). Материалы к изучению зонального распространения грибов в Грузинской ССР. [Materials from the study of zonal distribution of fungi in the Georgian S.S.R.]—*Trud. Inst. Zashch. Rast. Acad. Sci. Georgia*, **12**, pp. 181–194, 217–225, 1957. [Georgian. Abs. from Russian summaries.]

In the highlands of Mtatusheti (1,500–3,000 m.) cereal smuts are very widespread, causing 55% loss in wheat. Also epiphytotic are *Bremia lactucae* [map 86] on lettuce, *Puccinia helianthi* [map 195] on *Helianthus* spp., and *Uromyces fabae* [map 200] on [broad] bean.

The 2nd paper deals with 128 fungi isolated from wild plants in the forests and meadows of Georgia.

Teterevnikova-Babayan (Mme D. N.). Болезни посевных и луговых кормовых злаков в Армянской ССР. [Diseases of cereals and forage crops in the Armenian S.S.R.]—97 pp., 56 fig., Yerevan, Yerevan University, 1954. 4.35 roubles. [Received Aug. 1958.]

This survey covers 70 fungal diseases and 1 bacterial; 37 are newly recorded for the country. The fungi include 1 phycomycete, 9 ascomycetes, 27 Uredinales, 11 Ustilaginales, and 23 imperfect fungi. Recommendations for control are given.

Melik-Khachatryan (D. G.). О некоторых паразитных несовершенных Грибах в Армянской ССР. [On some imperfect parasitic fungi in the Armenian S.S.R.]—*Nauch. Trud. erevans. Univ.*, Ser. Biol., **49**, 5, pp. 119–145, 1955. [Armenian summary. Received Aug. 1958.]

Following a survey over several years by the Institute of Morphology and Systematics, Yerevan University, Armenia, 38 spp. of Melanconiales are noted, 17 of which are newly recorded for the country. The following are of economic importance in Armenia: *Gloeosporium campestre* and *G. saccharinum* on maple (*Acer* sp.), *G.* [*Gloeosporidium*] *betulinum* on birch, *G.* [*Monostichella*] *robergei* on hornbeam, *G.* [*M.*] *coryli* on hazelnut (*Corylus* sp.), *G. corni* on *Cornus* sp., *G.* [*Titaeosporina*] *tremulae* on poplar, *G.* [*Pseudopeziza*] *ribis* on currants, *G. salicis* on willow, *Kabatiella caulivora* on clover, *Sphaceloma ampelinum* [*Elsinoe ampelina*] on vine, *Tubercularia vulgaris* [*Nectria cinnabarina*] on currants, *Pigottia astroidea* on elm, *Colletotrichum lagenarium* on cucumbers [map 313], *C. lindemuthianum* on beans (*Phaseolus vulgaris*) [map 177], *Marssonina juglandis* [*Gnomonia leptostyla*: **36**, p. 6] on walnut, *M. populi* on poplar, *M. rosae* and *Monochaetia depazeoides* on rose, *M. salicicola* on willow, *Didymosporina aceris* and *Coryneum foliicolum* on maple, *Coniothecium quercinum* and *Septogloeum querceum* on oak, *Cylindrosporium maculans* [*Phleospora mori*] on mulberry, *C. quercus* on oak, *C. ranunculi* on *Ranunculus* sp., *C. ulmi* on elm, *Phleospora* [*Mycosphaerella*] *oxyacanthae* on hawthorn (*Crataegus* sp.), and *Septoria ribis* on currants. *P. mori* on mulberry and *G. leptostyla* on walnut have been extremely destructive and widespread in the last 10 years.

Morochkovsky (S. F.). Матеріали до мікофлори заповідника Хомутовський степ. [Materials on the fungus flora in the game reserves of the Khomutov steppe.]—*J. Bot. Acad. Sci. Ukr.*, **13**, 3, pp. 74–86, 1956. [Russian summary. Received Sept. 1958.]

This is an analysis of 144 species and 38 forms of micro-fungi collected on wild plants from 1952 to 1955.

Morochkovsky (S. F.). Матеріали до мікофлори заповідника Кам'яні Могили. [Materials for a fungus flora of the Kamenniye Mogily reserve.]—*J. Bot. Acad. Sci. Ukr.*, **14**, 2, pp. 60–68, 1957.

An annotated list is presented of 79 species and 32 forms collected in a steppe reserve in the Stalinskaya region. Included are *Puccinia tulipae* on *Tulipa graniticola*, *P. littoralis* on chicory, *P. menthae* on mint, and *Clasterosporium carpophilum* on *Prunus spinosa*.

Ferchau (H. A.) & Johnson (T. W.). **Taxonomy of the Cenangium dieback fungus.**—*For. Sci.*, **2**, 2, pp. 281–285, 1956.

Rehm's material on which he based the name change of *Peziza abietis* to *C. abietis* was found to agree with Fries' description of *C. ferruginosum* (which bears the earliest valid epithet) [**25**, p. 283; **34**, p. 117]. In a comparative study of *C. ferruginosum* and *C. atropurpureum* from some 160 exsiccati representative of U.S.A., Europe, and Japan, fresh material from the Duke Forest where the dieback fungus is common, and type material of *C. atropurpureum*, apothecial size and pigmentation were found to be inconsistent and there was no correlation between apothecial and ascus sizes and pigmentation. In Rehm's material ascus size was comparable to that of *C. atropurpureum*, also the host range of the two was similar. The authors conclude that *C. atropurpureum* is a variant of *C. ferruginosum*, the latter name having priority.

Luttrell (E. S.). **Inheritance of sex reaction in Cochliobolus nodulosus.**—Abs. in *Phytopathology*, **48**, 6, p. 344, 1958.

Sex in *C. nodulosus* [**37**, p. 78] is determined by a single pair of factors, MT/mt. Among single-ascospore cultures from crosses between a slow-growing mt strain and a fast-growing, non-conidial MT there was a ratio of 47 MT:53 mt strains. Sex reaction factors segregated independently of those for growth rate and sporulation. MT strains showed a tendency to 'maleness'.

Lockwood (J. L.) & Ballard (J. C.). **Soil temperature tanks with polyethylene film liners.**—*Plant Dis. Reptr*, **42**, 6, pp. 814–816, 3 fig., 1958.

A wooden soil-temperature tank in use at the Michigan Agricultural Experiment Station, E. Lansing, has a waterproof lining of 6 mm. polyethylene film and is equipped with heater, thermoregulator, stirrer, and adjustable stand for holding plant containers.

Sackston (W. E.). **Aster yellows: a virus that attacks many plants.**—*Res. for Fmrs*, **3**, 3, pp. 15–16, 3 fig., 1958.

In 1957 aster yellows virus was widespread and destructive in Western Canada, causing about 15% yield losses in flax [cf. **36**, p. 177] in Manitoba and slightly less in Saskatchewan, while those in lettuce and other susceptible crops were very severe. The heavy outbreak was due to extensive immigration of leafhoppers (*Macrosteles fascifrons*), 14% of which were infective on arrival. Tests at Winnipeg indicate that some lines of sunflowers are more resistant to the virus than others; the nature of this resistance is unknown though it appears to be inherited.

Lange de la Camp (Maria). **Die Verbreitung von Cercosporella herpotrichoides Fron in Mittel Deutschland.** [The distribution of *Cercosporella herpotrichoides* Fron in Central Germany.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **12**, 6, pp. 109–113, 1 map, 1958. [English and Russian summaries.]

Following extensive field studies the author reports from the Institut für Phytopathologie, Aschersleben, that *C. herpotrichoides* [**37**, p. 202] is widespread in the Central German cereal-growing regions. The disease was present in all investigated

cereal fields in the Harz mountains, but in the neighbouring lowlands incidence was irregular.

HEYNE (E. G.). **Registration of improved Wheat varieties, XXI.**—*Agron. J.*, **50**, 7, pp. 396–399, 1958.

Among these 11 newly registered varieties [cf. **31**, p. 546] is LaPorte (Reg. No. 356), a soft red winter wheat developed by Purdue University Agriculture Experiment Station, possessing moderate mature plant resistance to leaf rust [*Puccinia triticina*], high resistance to the races of powdery mildew [*Erysiphe graminis*] prevalent in Indiana, and resistance to soil-borne [wheat] mosaic [virus: cf. **35**, p. 439] and loose smut [*Ustilago nuda*]. The medium-early Bledsoe (359), developed at Georgia Coastal Plain Experiment Station, has a semi-winter growth habit and soft red grain: it is resistant to the prevalent races of leaf rust and stem rust [*P. graminis*] and to soil-borne mosaic, and moderately resistant to mildew.

SILL (W. H.) & KING (C. L.). **The 1957 soil-borne Wheat mosaic epiphytotic in Kansas.**—*Plant Dis. Reptr*, **42**, 4, pp. 513–516, 1 fig., 1958.

Severe infection by soil-borne wheat mosaic virus [**32**, p. 674 and above] caused losses of 5–12 bush./acre in winter wheat. In all tests in infested soil the highly resistant Concho yielded the best even though badly lodged, Comanche usually being second.

LAL (S. B.). **Strains of Wheat streak mosaic virus and their combinations with Barley stripe and Brome mosaic viruses.**—*Diss. Abstr.*, **27**, 12, p. 2781, 1957.

Of 414 samples of wheat streak mosaic virus [**37**, pp. 82, 467] collected from wheat and grasses in Kansas and the Great Plains, 372 belonged to the yellow streak mosaic virus (probably identical with wheat yellow streak mosaic strain), most prevalent in Kansas except in the S.E., while 42 showed other symptom types [loc. cit.], including possibly the wheat green streak mosaic strain also; 12 were mixtures of 2 or more strains. In combinations of strains the virulent ones dominated the reaction in the greenhouse, but not always in the field; the mild mosaic strain protected Pawnee wheat against the 4 other strains, which also cross-protected one another.

Comparative visual and dry weight analyses indicated that brome mosaic virus (BMV) [**36**, p. 313] produced the most severe disease on wheat, followed by barley stripe mosaic virus (BSMV) and then wheat streak mosaic virus (WSMV). BSMV+BMV were synergistic and induced sterility and death of seedlings. The 3 viruses combined had about the same severity as BSMV+BMV, which tended to dominate in all reactions. All 5 strains of WSMV exhibited synergism when in combination with BMV and BSMV, but none when combined with each other.

STEWART (D. M.), COTTER (R. U.), & ROBERTS (B. J.). **Physiologic races of Puccinia graminis in the United States in 1957.**—*Plant Dis. Reptr*, **42**, 7, pp. 881–887, 2 graphs, 1958.

Among 1,059 isolates of *P. graminis* from 668 uredial collections on wheat [**37**, p. 272] 27 races and subraces were identified. The isolates comprised race 15B (32%), 56 (29%), the groups 11–32 (13%) and 17–29 (9%), race 38 (7%), and 48A (3%), the remaining 7% including 19 other races. There was a change in the population of subraces within 15B, Golden Ball, very susceptible to most isolates in 1956, being resistant in 1957.

From 415 collections on oats 522 uredial isolates were identified, of which races 7 and 12 comprised 59%, 8 and 10 21%, 2 and 5 about 12%, 7A 6%, and 6 and 13 almost 3%. Subrace 7A was found in 11 States, 5 more than in the previous year. A new subrace, isolated in New York and provisionally designated 13A, proved the

most virulent in the U.S.A., attacking oats possessing each of the 3 types of resistance available in commercial vars.

Among isolates from barberry, 11, 59, and 56 were the most frequent races of *P. g. tritici*; 2, 5, 12, and 13 of *P. g. avenae* were identified in Virginia.

Green (G. J.) & Johnson (T.). **Further evidence of resistance in Berberis vulgaris to race 15B of Puccinia graminis f.sp. tritici.**—*Canad. J. Bot.*, **36**, 3, pp. 351–355, 1958.

In this further study from the Canada Dept Agric., Winnipeg, Manitoba [cf. **34**, p. 28], inoculation of barberry with sporidia from pure cultures of race 15B-4 and from teliospores collected in the field from Vernal wheat, which is selective for 15B, caused infections only of a resistant type. Susceptible type infections occurred in parallel inoculations with sporidia from other vars. not selective for 15B. It appears that 15B has lost much of its former ability to infect barberry, and as it occurs now is probably derived from one or more mutations towards avirulence.

Fuchs (W. H.) & Gaertner (A.). **Untersuchungen zur Keimungsphysiologie des Schwarzrostes Puccinia graminis tritici (Pers.) Erikss. u. Henn.** [Studies on the germination physiology of black rust, *Puccinia graminis tritici* (Pers.) Erikss. & Henn.]—*Arch. Mikrobiol.*, **28**, 3, pp. 303–309, 6 fig., 1958.

At the Institut für Pflanzenpathologie und Pflanzenschutz, Georg-August University, Göttingen, Germany, the addition of Fe compounds, undenatured egg yolk, cysteine, leucine, and glutathione to the medium stimulated both vesicle formation and longitudinal growth of the hyphae of *P. graminis* [cf. **36**, p. 88 and below] in the presence of pyridoxine.

Fuchs (W. H.) & Bauermeister (Renate). **Über die Wirkung von Thiosemicarbazid auf die Entwicklung von Puccinia graminis tritici auf Weizen.** [On the action of thiosemicarbazide on the development of *Puccinia graminis tritici* on Wheat.]—*Naturwissenschaften*, **45**, 14, pp. 343–344, 1958.

In further studies [see above] the infiltration into Marquis wheat plants, immediately before inoculation with *P. graminis*, of 2×10^{-3} thiosemicarbazide arrested development shortly after germination and totally inhibited sporulation. Applied on the 3rd day after inoculation it virtually prevented the formation of pustules, which were replaced by isolated, minute, yellowish foci with barely discernible sori. The quasi-complete stoppage of the growth of the intramatrical hyphae is presumably effected by changes in host metabolism, since spore germination proceeds unchecked in thiosemicarbazide solutions. The treatment caused an immense increase in the content of soluble amino acids in the leaf, with a correspondingly heavy drop in the level of soluble sugars.

Attention is drawn to a thesis by Heitefuss (Göttingen University 1957), where similar observations are reported in connexion with *Peronospora parasitica* on cabbage.

Kamal (M. A. M.) & Naguib (M. I.). **Carbohydrate changes in Wheat and Barley grains as a result of black stem rust and leaf net blotch respectively.**—*Ann. agric. Sci., Cairo*, **2**, 1, pp. 95–103, 1957. [Arabic summary.]

The decrease in grain weight of wheat due to *Puccinia graminis* [cf. **37**, p. 654] was from 4·45 to 1·39 g./100 grains in Hindi and from 4·16 to 1·35 in Tousson while *Pyrenophora teres* had no effect on the weight of barley grains. The corresponding figures for reduction of total carbohydrates in the grain were 2,310·3 to 438·78 mg. glucose/100 grains; 2,171·89 to 462·94; and 1,313·68 to 1,118·88.

Freitas (A. P. do C.). **Puccinia rubigo-vera tritici—IV. Raças fisiólogicas isoladas em Portugal em 1955 e grau de resistência, em plantas jóvens, de alguns Trigos.**

[*Puccinia rubigo-vera tritici*—IV. Physiologic races isolated in Portugal in 1955 and grade of resistance in young plants of some Wheats.]—*Agron. lusit.*, **19**, 3, pp. 233–250, 1 diag., 1957. [English summary.]

Uredospore collections of *P. rubigo-vera tritici* [*P. triticina*] were classified into races 11, 68, 75, 78, 87, and 143 [**34**, p. 141; **37**, p. 226]; race 11 was represented and generally predominated in every year of a consecutive 8-yr. period. Of 279 young wheat plants from the National Agronomic Station's collection tested for their reactions to races 3, 11, 73, 87, and 143, Bárbaro, Castilla 3, Frontana (*Triticum aestivum*), Hamira AC 5 (*T. durum*), Egipto (*T. pyramidale*), *T. dicoccum* No. 2127, and 3 strains of *T. monococcum* proved highly resistant.

Novikova (Mme T. N.). Гистологическое изучение в заимоотношений Пшеницы и **Puccinia triticina Erikss.** в условиях разного питания. [Histological study of the relation between Wheat and *Puccinia triticina* Erikss. under different conditions of nutrition.]—*J. Kharkov agric. Inst.*, **13**, 50, pp. 133–147, 1957. [Abs. from *Referat. Zh. Biol., 1958*, 6, p. 197, 1958.]

Seeds of Artemovka (susceptible) and Melyanopus 69 (resistant) spring wheats were soaked in solutions of B, Zn, Fe, Mn, and Li, or the micro-elements were introduced into the soil, with and without fertilizers, before sowing. Brown rust (*P. triticina*) [**37**, p. 345] was checked at all stages and the pustules and fungus dimensions were reduced.

Andreev (L. N.). Влияние поражения ржавчиной на фотосинтез и водный режим Пшенично-пырейных гибридов. [The influence of rusts on photosynthesis and the water relations of Wheat-grass hybrids.]—Бюл. главн. бот. Сада [*Bull. centr. bot. Gdn, Moscow*], *1958*, 30, pp. 66–71, 5 graphs, 1958.

In a preliminary study in the Moscow district in 1955 it was found that the intensity of photosynthesis showed a daily increase only when infection by *Puccinia triticina* was weak. In a comparative study at the Przheval'sk Grain Station, Kirgiz S.S.R., with the winter wheat-grass hybrids 1, 186, and 599 infected by yellow rust (*P. glumarum*) [**36**, p. 592] and tested in mid-July 1956 at 6, 9, 12, 15, and 18 hr., the intensity decreased in the 2nd half of the day, because of the dehydration of the plant which cannot be remedied during the night. Diseased plants had a higher transpiration capacity and this limited photosynthesis.

Costa (J. J.). **Estudio comparativo de los métodos de laboratorio y de campo para la valoración de anticaries comerciales ; sus valores reales y prácticos.** [Comparative study of the laboratory and field methods of assessing commercial anti-bunt products; their real and practical value.]—*Rev. Fac. Agron. B. Aires*, **14**, 1, pp. 22–42, 4 fig., 1 graph, 1957.

At the Instituto de Fitopatología, Buenos Aires, a comparison of 2 methods for the evaluation of fungicides against *Tilletia caries* on wheat showed that some non-metallic, synthetic organic products which would have been considered from slide germination tests as non-toxic to the fungus were more fungicidal than the metallic compounds in the field and, in general, less toxic to man and domestic animals.

Yoshii (H.) & Yamamoto (S.). **On the hot bath water treatment of Wheat seed for the control of loose smut, Ustilago tritici Rostrup.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 169–172, 5 fig., 3 graphs, 1957.

The use of the domestic bath for hot water treatment against *U.* [*nuda*] is described. Wheat seeds are put into water at an initial temp. of 45–46° C. and left for 5 hr. A 10 hr. immersion is equally effective, neither treatment causing damage to the seed.

Chinn (S. H. F.) & Ledingham (R. J.). **Application of a new laboratory method for the determination of the survival of Helminthosporium sativum spores in soil.**—*Canad. J. Bot.*, **36**, 3, pp. 289–295, 2 graphs, 1958.

At the Plant Pathology Field Laboratory, Saskatoon, Saskatchewan, a method for recovering spores from soil [**35**, p. 174] was modified by mixing the oil-water emulsion containing the spores with PDA+1% molasses. Slides were dipped in this, incubated in a humid atmosphere at 24° C. for 12–15 hr., wiped clean on one side and stained with cotton blue on the other, and examined for spore germination.

Soil inoculated with spores of *H. sativum* [*Cochliobolus sativus*] was maintained at 5 moisture levels from 18 to 88% and spore survival tested over a 9-month period. Parallel observations were made on wheat seedling disease rates in similar soil. Whereas in the dryest soil spore survival remained unchanged at 95% over the test period, in wet soil it fell to 2%. Seedling infection was lowest in the saturated soil. Samples collected from wheat stubble in the field showed little change in viability from autumn to spring, but a summer fallow between 2 wheat crops resulted in a marked decline, percentage germination falling from 91 in Oct. 1954 to 40 in June 1956.

Louw (H. A.). **Microbiological analysis of a Western Cape Province grain soil under various crop rotations.**—*Sci. Bull. Dep. Agric. S. Afr.* 378, 36 pp., 1 fig., 1 diag., 6 graphs, 1957. [49 refs.]

A microbiological analysis carried out at Stellenbosch on gravelly loam of low fertility under 4 different crop rotation systems [cf. **37**, p. 77] over 2 yr. indicated that in 1952 the bacterial population was highest in lucerne-wheat plots, lowest in wheat-fallow plots, and intermediate in lupin-wheat ones; the same applied in 1953, but the populations were much lower. Microbial activity was highest in legume-wheat plots, but so also was the incidence of take-all (*Ophiobolus graminis*) [see below], which may upset the correlation otherwise recognized between such activity and soil fertility.

Louw (H. A.). **The effect of various crop rotations on the incidence of take-all (Ophiobolus graminis Sacc.) in Wheat.**—*Sci. Bull. Dep. Agric. S. Afr.* 379, 12 pp., 4 fig., 1 graph, 1957.

The increased microbial activity in the soil, brought about by crop rotation (legumes-wheat), was found to aggravate rather than suppress the incidence of take-all [see above], contrary to Garrett's findings [**21**, p. 481], but although positively correlated with microbial activity, its incidence is also subject to other factors.

Kurata (H.) & Nishimura (J.). **Studies on the control of Corticium foot-rot of Wheat plants. I. Soil conditions and disease incidence.**—*Ann. phytopath. Soc. Japan*, **22**, 2, pp. 97–102, 1957. [Japanese. Abs. from English summary.]

This disease, caused by *C. gramineum* [**35**, p. 883], is characterized by dark-brown, basal stem lesions, and infection of young leaves in severe cases. The least injury occurred on plants grown in sandy soil with added organic manure, chemical fertilizers, and lime, while loam and clay soil favoured disease development. The microbial population of the soil varied seasonally with soil types and fertilizers; the severity of the disease increased with the number of soil fungi and decreased with that of bacteria.

De Tempe (J.). **Aspecten van ontsmetting met Kwikhoudende middelen bij Zomergranen.** [Aspects of mercurial seed dressing of spring-sown cereals.]—*Tijdschr. PlZiekt.*, **64**, 2, pp. 150–162, 2 fig., 12 graphs, 1958. [English summary.]

The author reports from the Rijksproefstation voor Zaadkontrolle, Wageningen,

studies during 1955–57 on the action of mercurial seed dressings on spring wheat infected with *Fusarium* spp. and spring barley infected with *Helminthosporium sativum* [*Cochliobolus sativus*]. Counts of emergent seedlings were made and also yield comparisons on the basis of the total wt. of field-dry plants from 100 seeds sown. A 1% reduction in emergence was caused by 3–5% *Fusarium* infection (wheat) and 3–25% *Cochliobolus* infection (barley). The effects of the treatment were usually but not always favourable, thus in 1956 treated wheat showed a 3% reduction in plant wt. while in 1957 barley showed 1·5% fall in emergence and a 10% reduction in plant weight. In 1957 thiram was examined also, and gave far better increases in emergence (10% for wheat, 4% for barley with disease-free seed) and plant weight, attributable partly to improved protection of plants developing from weak seed and partly to the absence of the phytotoxic effect of Hg. With disease-free seed the protective action of the Hg was normally outweighed by the injurious effects.

Clark (R. V.) & Dickson (J. G.). **The influence of temperature on disease development in Barley infected by Helminthosporium sativum.**—*Phytopathology*, **48**, 6, pp. 305–310, 1 fig., 5 graphs, 1958.

In joint studies by the Canada Dept of Agric., Ottawa, and the University of Wisconsin, Madison, 6 vars. of barley were tested against 6 strains of *H. sativum* [*Cochliobolus sativus*: **37**, p. 249] at 8–28° C. Leaf infection was obtained by spraying with a spore-mycelial suspension, and root and seedling infection with a sand-maizemeal inoculum added to the quartz sand planting medium. Spot blotch decreased at lower temps.; pathogenicity varied among the isolates of the fungus, and some caused no disease at 20 and 16°. The host vars. in general reacted similarly; Olli was the most susceptible.

The effect of root rot and seedling blight was assayed by the height of the seedlings and by discoloration indices, though the latter were considered less reliable. Differences at varying temps. were less marked than with leaf infection. There were again differences in pathogenicity of isolates and in the response of the host vars., the opt. temp. for the growth of which was 20–24°.

Natsvlishvili (A.). Полосатая пятнистость Ячменя (**Helminthosporium gramineum R.**) и меры борьбы с ней. [Leaf stripe (*Helminthosporium gramineum* R.) of Barley and its control.]—*Trud. Inst. Zashch. Rast. Acad. Sci. Georgia S.S.R.*, **11**, pp. 231–254, 5 fig., 1 graph, 1956. [Georgian. Abs. from Russian summary. Received Sept. 1958.]

This is a detailed study of *H. gramineum*, which causes great damage to barley [cf. **36**, p. 758] in N. Georgia (22% loss of grain). Paladium 185, Paralelum, Achaltsichski 294/27, Nutanse 36/35, Dushetskii 63/19, and Onskii 22/27 are the most resistant vars. Ammonium nitrate and superphosphate (70:150 kg./ha.) or the same+KCl (60 kg./ha.) increased resistance.

Bryner (C. S.). **Inheritance of scald resistance in Barley.**—*Diss. Abstr.*, **27**, 12, p. 2752, 1957.

The Pennsylvania isolate of *Rhynchosporium secalis* [**37**, p. 655] reacted on the Argentine differentials for barley scald like the Argentine race No. 3. Of 42 vars. of winter barley tested in the field in 1951–2 under the disease 'build up' conditions, 7 awned vars. were resistant. Reciprocal crosses of Brier with Kenbar or Wong produced resistant F_1 progeny, but Kenbar × Wong progenies were susceptible.

Kenbar's mild field resistance is probably based on one or more modifying genes. It is suggested that the Brier type of resistance, which is conditioned by a single dominant gene, be denoted as Rh_a.

Mode (C. J.) & Schaller (C. W.). **Two additional factors for resistance to net blotch in Barley.**—*Agron. J.*, **50**, 1, pp. 15–18, 1958. [*Biol. Abstr.*, **32**, 7, p. 1849, 1958.]

At the University of California, Davis, 3 genes, Pt_1, Pt_2, and Pt_3, conferring resistance to net blotch [*Pyrenophora teres*] in barley were identified. Pt_1 and Pt_2 were closely linked (2·57% recombination), while Pt_3 was inherited independently. These genes were independent of the Hanna gene for resistance to mildew [*Erysiphe graminis*] carried by Atlas 46.

Ralski (E.) & Mikołajewicz (T.). **Z badań nad wrażliwością form Jęczmienia na mączniaka właściwego (Erysiphe graminis DC f. hordei Marchal).** [Investigations on the resistance of Barley varieties to powdery mildew (*Erysiphe graminis* DC. f. *hordei* Marchal).]—*Hodowla rośl. Aklim. Nasien.*, **2**, 3, pp. 313–333, 1958. [English and Russian summaries.]

Glasshouse and field investigations were carried out at the Baków Breeding Res. Station, Poland, in connexion with high yield losses (3·8–27·4%) caused by this fungus, using 240 barley vars. and a local race of *E. graminis*. Out of 150 vars. which gave consistent results during 1952–57 9 resistant vars. of economic importance were isolated (B 2145, Abyssinian 5336, CI 75, B 18, Eupopeum, Flauengerste from Urien, Milenium, New Universal, Nutans 17) and several others of no value; all the regional Polish vars. tested were highly susceptible.

Preliminary investigations in 1957 with test host vars. indicated the presence of 3 physiologic races of *E. graminis*: C_2 (No. 14), C_3 (15), and C_4 (16), of which C_2 is the most widespread in Poland.

Hirata (K.) & Togashi (K.). **Some observations on the relation between the penetration hypha and haustorium of the Barley mildew and the host cell. (III). (1) Initial infection of auxiliary cell, (2) Increment of susceptibility by calcium salts.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 230–236, 1 fig., 1957. [Japanese. Abs. from English summary.]

In this further study [cf. **37**, p. 158] it is reported that auxiliary cell infection by the first haustoria constituted 90% of the total infection of barley leaves inoculated with conidia of *Erisyphe graminis hordei* race 1 and standing in water. Standing in solutions of Ca salts increased susceptibility while reducing the proportion of auxiliary cell infection and had the same effect with race 9 of *E. g. hordei* and with *Agropyron* mildew. Magnesium chloride had a similar effect to Ca salts, but smaller, barium chloride decreased susceptibility, and K and Na salts had no marked influence on it. Lithium chloride increased resistance considerably; ammonium salts increased it in some instances. Mixtures of Na or K salts with Ca salts had intermediate effects on susceptibility; Li was antagonistic to Ca, the effect of which was also slightly diminished by darkening the leaves or washing them with running water.

Rusch (R.). **Untersuchungen über die Überwinterungsweise des Haferflugbrandes (Ustilago avenae (Pers.) Jens.) und den brandmindernden Einfluß tieferer Keimbettemperaturen.** [Investigations into the overwintering of loose smut of Oats (*Ustilago avenae* (Pers.) Jens.) and the smut reducing influence of low seed-bed temperatures.]—*Angew. Bot.*, **31**, 6, pp. 221–239, 2 graphs, 1957.

At the Institut für Physiologische Botanik der Biologischen Bundesanstalt für Land- und Forstwirtschaft, Brunswick-Gliesmarode, Germany, infiltration of oat seed with spore suspensions of *U. avenae* by the partial vacuum method [cf. **36**, p. 312] was decreasingly effective in causing infection the longer the seed was kept damp after inoculation, or the greater the interval between a temporary damping and sowing. Inoculation with spores in a more or less advanced stage of germina-

tion was less effective the longer the spores had previously been kept under conditions favouring germination, and the longer the period between the possible beginning of germination and the time of inoculation. Inoculation with macerated 4-week-old or older mycelium produced infection only when the oat embryos were introduced into the culture medium and subjected several times to strong pressure. The fungus overwinters by means of spores between the caryopsis and the glumes [**19**, p. 82].

Germination of infected seed at 7° C. [**37**, p. 406] considerably reduces incidence, at 0–2·5° C. the reduction being equivalent to the best results achieved by seed disinfection. The effect is attributable to the fact that in this region the temp. requirements of the host and fungus do not quite correspond, and early sowing in the spring is therefore recommended for susceptible vars.

Veenenbos (J. A. J.) & Brandsma (T. W.). **Kunstmatige besmetting van haver met stuifbrand, Ustilago avenae (Pers.) Jens.** [Artificial contamination of Oats with loose smut, *Ustilago avenae* (Pers.) Jens.]—*Tijdschr. PlZiekt.*, **63**, 6, pp. 375–379, 1958. [English summary.]

Following a comparison at the Plantenziektenkundige Dienst, Wageningen, of several methods for the artificial inoculation of oats with *U. avenae*, Ponchet's method [cf. **35**, p. 517], in which the grain is soaked in spore suspension or presoaked in tap water before mixing with dry spores, was preferred for the sake of convenience, though it gave only 10% smutted panicles, compared with 14% by Haaring's 'wet vacuum' method (*Bot. Arch.*, **29**, pp. 444–473, 1930). For best results the grain must be dried directly after inoculation.

Grasso (V.). **Genetica dei carboni dell' Avena. Ulteriori indagini sul fenomeno della letalità parziale e totale di una collezione di Ustilago kolleri da Parma.** [The genetics of the Oat smuts. Further researches on the phenomenon of the partial and total lethality of a collection of *Ustilago kolleri* from Parma.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **15** (*1957*), 1, pp. 39–61, 4 fig., 1 diag., 1958. [English summary.]

In further studies at the University of Minnesota and the State College of Washington, *U. kolleri* [*U. hordei*] from oats in Italy [**35**, p. 178] was crossed with *U. avenae*. The F_1 chlamydospores on potato dextrose agar germinated with a long, irregular promycelium and produced a few sporidia, which multiplied slowly for the first 2 or 3 days, after which growth ceased. The F_2 chlamydospores behaved in the same way. The work is still in progress.

Gröger (D.). **Über den Nachweis freier Aminosäuren im Honigtau des Mutterkorns.** [On the demonstration of free amino acids in the honeydew of ergot.]—*Arch. Pharm. Berl.*, **291**, 2, pp. 106–109, 1958.

At the Institut für Kulturpflanzenforschung, Gatersleben, Germany, using chromatographic methods, the author demonstrated the occurrence of 19 free amino acids in 4 strains of *Claviceps purpurea* from rye [cf. **36**, p. 315; **37**, p. 230, *et passim*].

Pappelis (A. J.). **Nature of resistance to Diplodia stalk rot of Corn.**—*Diss. Abstr.*, **27**, 12, pp. 2782–2783, 1957.

It was observed at Iowa State College on 14 Sept. 1955 that the stalk rot (*Diplodia zeae*) [*D. maydis*: **36**, p. 583] ratings of 6 maize vars. were highly correlated with the water content and density of the whole tissue and of pith cores; on 22 Sept. with pith condition in 1st and 4th internodes; and on 11 Oct. with the 1st internode pith condition and natural crown rot percentages; these findings for artificial inoculation were related to those for natural stalk rot.

On 7 Sept. 1956 stalk rot ratings were highly correlated with pith core density and pith condition in the 1st and 4th internodes of 14 vars. Using a neutral red stain and a plasmolysing solution, the pith tissue of the susceptible vars. was shown to be air filled and dead, except for a few cell layers round the vascular bundles, while in the resistant the tissue was alive and producing phenolic substances which were released on wounding in a conc. toxic to certain fungi: discoloration of the tissues could be accounted for by oxidation and condensation of the free phenols.

Kulik (T. O.). Нігроспороз Кукурудзи на Україні. [Nigrosporiosis of Maize in the Ukraine.]—Укр. бот. Журн. [*J. Bot. Acad. Sci. Ukr.*], **13**, 3, pp. 87–91, 3 fig., 1956. [Russian summary. Received Sept. 1958.]

In the Dnepropetrovsk region nigrosporiosis (*Nigrospora oryzae*) [**35**, p. 602; **37**, p. 231] decreased from 9·4% in 1950 to 1·3% in 1952, whereas in Sinel'nikov region the yield was reduced by 25% each year during 1952–55. Deep sowing and early harvest are recommended. Destruction of plant remains in the fields and seed selection from healthy cobs are essential.

Van der Zwet (T.). **The effect of flooding on Pythium root rot in nonsterile soil.**—Abs. in *Phytopathology*, **48**, 6, pp. 345–346, 1958.

Severe root rot of sugarcane and maize has been artificially induced by *P. arrhenomanes* [cf. **34**, p. 184; **35**, p. 672] only in sterilized soil. Since the disease occurs in the field in wet conditions the effect of flooding infested, non-sterile soil was investigated in the laboratory. Severe root rot was obtained in soil flooded for 72 hr., and flooding 2 days after planting maize seedlings resulted in more infection than flooding before or at planting or more than 2 days afterwards. Maize planted in flooded soil 2 days after infestation showed 38·5% root infection compared with 2·5% in the non-flooded control.

Atkins (J. G.) & Adair (C. R.). **Authorities report on discovery of hoja blanca in Florida ; also resistance tests in Cuba, Venezuela.**—*Rice J.*, **61**, 1, pp. 10, 12–14, 2 fig., 1958.

Much of this information on this rice disease has already been noted [**37**, p. 282].

Watanabe (T.). **Studies on the vaccine therapy of the blast disease of Rice plants. X.—The detection of the plant hormone.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 143–147, 3 fig., 1957. [Japanese. Abs. from English summary.]

In these further studies [cf. **33**, p. 112] the presence of a plant hormone resembling β-indole acetic acid was demonstrated in 0·5% dry vaccine B of *Piricularia oryzae*, and in the chloroform and ether extracts of the vaccine, by the use of Went's pea method and the sand culture method. The author suggests that the hormone is produced by the fungus and if applied to rice seed its effect on the embryo cells is expected to be beneficial for germination, growth, yield, and resistance to blast disease.

Toyoda (S.) & Suzuki (N.). **Histochemical studies on the lesions of Rice blast caused by Piricularia oryzae Cav. II. Changes in the respiration of infected tissues.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 173–177, 1 fig., 1957. [Japanese. Abs. from English summary.]

A study of the respiration of the marginal zone of *P. oryzae* leaf lesions on a susceptible rice var. (Aiti-asahi) and a resistant one (Kanto 53) showed that in Aiti-asahi respiration is stimulated 4–5 times, while in Kanto 53 it never exceeds twice that of healthy tissue. The RQ is generally 0·8 in healthy and 0·9 in infected tissue and the Pasteur effect is marked in the susceptible var. only. As metal enzyme

inhibitors affect the resistant vars. only, it is suggested that flavoprotein acts as a terminal oxidase in infected tissue instead of metal protein enzymes, this change bringing about the observed reactions in susceptible tissue.

Nonaka (F.). **Relation between the severity of Rice stem rot caused by Leptosphaeria salvinii Cat. and some other paddy Rice diseases. II. On the influences of neck and node blast (Piricularia oryzae Cav.) and sheath spot (Corticium sasakii (Shir.) Matsum.) to Rice stem rot disease severity.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 265–267, 1957. [Japanese. Abs. from English summary.]

It was observed that the severity of stem rot (*L. salvinii*) [**36**, p. 496] increased in the presence of node blast due to *Piricularia oryzae*, while resistance to stem rot was increased by a heavy infection of neck blast due to *P. oryzae* and by a heavy but not by a light infection of sheath spot (*Corticium sasakii*) [**36**, p. 664].

Chattopadhyay (S. B.) & Chakrabarti (N. K.). **Effects of methods of cultivation on the incidence of 'brown spot' disease in aus Paddy.**—*Indian Agric.*, **1**, 1, pp. 45–52, 1957.

Studies in 1952–3 by the State Agricultural Institute, Calcutta, showed that in broadcast sowing of autumn rice infection by *Helminthosporium oryzae* [*Cochliobolus miyabeanus*: **36**, p. 422] was moderate, but with notable varietal differences. With transplanting, all the vars. showed greater leaf and grain infection, with less varietal distinction. No correlation was observed between the intensity of leaf and of grain infection.

Asada (Y.). **Studies on the susceptibility of akiochi (autumn-decline) Rice plant to Helminthosporium blight. (III). Changes in nitrogen compounds, carbohydrates, reducing ascorbic acid and respiration accompanied by the infection of Cochliobolus miyabeanus and existence of hyphae in diseased spots. (VI). Some physiological observations on the diseased Rice plants affected with Cochliobolus miyabeanus. (Part I.).**—*Ann. phytopath. Soc. Japan*, **22**, 2, pp. 103–106, 2 graphs; 4–5, pp. 178–182, 1957. [Japanese. Abs. from English summaries.]

Results of further studies [**37**, p. 162] indicate that invasion by *C. miyabeanus* causes reduction in soluble and insoluble N, reducing sugar, and soluble carbohydrates, and an increase in insoluble carbohydrates in both normal and akiochi rice plants. QO_2 increased and RQ decreased in both, but the latter more so in akiochi plants.

Immersion in a culture filtrate of *C. miyabeanus* caused loss of weight both of healthy leaves and of leaves of akiochi plants affected by the fungus, but not of affected leaves of normal plants. Thiamine, essential for *C. miyabeanus*, is plentiful in akiochi leaves, and little reduced by infection, though this reduces it considerably in normal leaves. Infection increases respiration in both plants, but while in normal leaves oxidative phosphorylation is effective, in akiochi leaves it is less so. In the absence of O the lesions do not enlarge.

Kurosaki (Y.). **Über die Beziehung zwischen der Fleckengrößeverteilung und der Widerstandsfähigkeit von Reispflanzen bei der Helminthosporiose.** [On the relationship between 'spot-size-distribution' and the capacity for resistance of Rice plants to helminthosporiosis.]—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 251–256, 257–259, 15 graphs, 1957. [Japanese. Abs. from German summary.]

A mathematical study at the University of Kyoto demonstrating that the length of the lesions is a function of the resistance of the host and the duration of infection.

Takatsu (S.) & Toyama (A.). **Studies on the downy mildew of Rice plant. Part I. On the oospore germination and the infection to Rice seedlings by the oospore.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 123–128, 6 fig., 1957. [Japanese. Abs. from English summary.]

Oospore germination of *Sclerophthora* [*Sclerospora*] *macrospora* [**35**, p. 230] was found to occur from Jan.–May in leaves on soil flooded in autumn, and ranged between 0·14–4·08%; on dry soil no germination took place, unless the infected leaves were placed 2 cm. deep, when a slight amount occurred irrespective of soil water content. In soil flooded in early Mar., May, and at the end of Aug. germination began after 2 months, while oospores in rotted leaves in distilled water germinated after 48 hr. Soil extract did not promote germination, and tap water checked it. Opt., max., and min. temps. for germination were 18–20° C., 25–26°, and somewhat below 10–12°. The authors consider the oospores to be an important source of infection of wild grasses in autumn and rice seedlings in the nursery.

Norton (D. C.). **The association of Pratylenchus hexincisus with charcoal rot of Sorghum.**—*Phytopathology*, **48**, 7, pp. 355–358, 1 fig., 1958.

Greenhouse observations at Texas Agric. Experiment Station, College Station, indicated that some of the damage in sorghum attributed to *Macrophomina phaseoli* [cf. **36**, p. 242] may in fact be due to the activity of *P. hexincisus*, the effects of both organisms being greater under drought conditions.

Vlasova (Mme N. I.). Биологические особенности головни Чумизы и Могара. [Biological peculiarities of Foxtail Millet and Italian Millet smut.]—Бюл. Всес. н.-и. ин-та кукурузы. [*Bull. vsesoyuz. nauch.-issled. Inst. Kukuruz.*], *1957*, 1, pp. 38–41, 1957. [Abs. from *Referat. Zh. Biol. 1958*, 7, pp. 190–191, 1958.]

At the Pan-Soviet Maize Research Institute, Sinel'nikov region, cross inoculations with *Ustilago crameri* [cf. **34**, p. 365] on foxtail millet [*Setaria* sp.] and Italian millet [*Setaria italica*] were successful, but *S. italica* was more seriously affected. It was shown that foxtail bristle grass, in its green stage, is the source of infection for the 2 *Setaria* spp., which are not infected by *U. neglecta*.

Baines (R. C.), DeWolfe (T. A.), & Small (R. H.). **Control of the Citrus nematode, Phytophthora spp. and weeds by mylone 85W when applied by different methods.**—*Plant Dis. Reptr*, **42**, 7, pp. 876–880, 1958.

At the University of California, Riverside, mylone 85W applied to microplots of a sandy loam soil at 400 lb. active ingredient/acre in 6 and 8 acre-in. water, or mixed into the surface soil and irrigated with 6 acre-in. water, killed *P. citrophthora* and *P. parasitica* [**37**, pp. 235, 660] to a depth of 3 ft.

Ferreira (A. H.). **Considerandos sôbre os tratamentos fitossanitários dos Citrinos.** [Considerations on the phytosanitary treatments of Citrus.]—*Gaz. agric., Moçamb.*, **10**, 105, pp. 40–43, 1958.

Directions are given for the treatment of *Glomerella cingulata*, *Phoma* [*Guignardia*] *citricarpa*, *Elsinoe fawcettii*, *Diaporthe citri*, exanthema, and *Capnodium citri* by spraying with Bordeaux mixture; of *Diplodia natalensis* with Bordeaux paste; and of concentric ring blotch [**37**, p. 585] with lime-sulphur. The last may also be substituted for Bordeaux against *E. fawcettii* at 3–4:100 for the 1st application and 2–2·5 thereafter. The addition of 1% miscible oil (alboleum) to Bordeaux is recommended. Some general indications for prevention by cultural methods are also given.

Licciardello (G.). **Il punto isometabolico di Deuterophoma tracheiphila Petri, agente del 'mal secco' degli Agrumi.** [The isometabolic point of *Deuterophoma*

tracheiphila Petri, the cause of 'mal secco' of Citrus.]—*Ann. Sper. agr.*, N.S., **12**, 3, pp. 913–924, 1958. [English summary.]

In studies at the University of Catania, Sicily, the isometabolic point for the growth of *D. tracheiphila* [cf. **32**, p. 584] in a culture medium containing organic N (asparagine)+vitamins (biotin and thiamine hydrochloride) and micro-elements was at pH 4–4·7; in a medium containing nitrate N and inorganic nutrients it was about pH 5·8–6·2.

Batista (A. C.) & Da Silva Maia (H. da S.). **Ontogênese de Myriangium citri P. Henn.** [Ontogeny of *Myriangium citri* P. Henn.]—*An. Soc. Biol. Pernambuco*, **15**, 2, pp. 355–360, 1 fig., 1957. [English, French, and German summaries.]

A histological study at the University of Recife, Brazil, of *M. citri* [**17**, p. 627] in orange fruits, in association or not with the coccid *Mytilococcus beckii* showed that its ontogeny resembles that of *M. duriaei* [**17**, p. 628], but an accompanying conidial state was present in the stroma.

Sludskaya (Mme L. A.). Материалы по микоризе Цитрусовых растений. [Data on the mycorrhiza of Citrus plants.]—Докл. Моск. с.-х. Акад. ин. К. А. Тимирязева [*Proc. Timiryazev agric. Acad.*], *1957*, 28, pp. 322–326, 1957. [Abs. from *Referat. Zh. Biol.*, *1958*, 6, p. 108, 1958.]

Citrus trees, mainly lemon and orange, from the Moscow, Kuybyshev, and Caucasus regions were examined for mycorrhiza, the absence of root hairs leading to the assumption that they would be present. Endotrophic and ecto-endotrophic types were discovered.

Bitancourt (A. A.). **O perigo da introdução de doenças do Cafeeiro no Brasil.** [The risk of introduction of Coffee diseases into Brazil.]—*Biológico*, **24**, 3, pp. 35–41, 1 fig., 1958.

This theme is illustrated by some important examples and the paper closes with an appeal for the prohibition of imports of coffee in any form, with the special object of excluding the 'tristeza' root rot of Tanganyika [stem-pitting of coffee: **36**, p. 643].

Vallejo (J. R.). **La viruela del Algodonero.** ['Smallpox' of Cotton.]—*Agricultura téc., Mex., 1956–57*, 3, pp. 38–39, 1957. [Abs. in *Coton et Fibres trop.* (*Bull. analyt.*), **12**, 3–4, p. 252, 1957.]

A severe outbreak of *Puccinia stakmanii* [*P. cacabata*: cf. Hennen *et al.*, **36**, p. 32; **37**, p. 85] on cotton in 1956 is attributed to the humidity and temperature conditions prevailing in Mexico during 1955, which favoured the development of the pathogen on its alternate host, *Bouteloua* spp., systematic extermination of which is the most practical method of control. Among the vars. attacked were Deltapine 15, Acala 4–42, Stoneville, and Empire.

Ashour (W. A.). **Effect of watering treatment, seed treatment and date of sowing on emergence and damping-off of Cotton seeds. Damping-off disease of Cotton. 1—Studies of the causal organisms and their pathogenicity.**—*Ann. agric. Sci., Cairo*, **1**, 2, pp. 161–176, 1956; **2**, 1, pp. 81–94, 1957. [Arabic summaries.]

Fusarium vasinfectum was isolated most frequently from damped-off cotton seeds [**37**, p. 43 and below], but *Rhizoctonia* [*Corticium*] *solani* (not present in winter) was most pathogenic; *Mucor* sp., *Rhizopus nigricans* [*R. stolonifer*], *Pythium debaryanum*, and *Stemphylium* sp. were also isolated. Emergence was better in the presence of all the 6 fungi in the soil than in the presence of any one alone. All the fungi were seed-borne.

Of 7 fungicides tested in the 1st study and 9 in the 2nd 1% fernasan seed dressing [cf. **36**, p. 378] was most effective in increasing the percentage of survival *in vitro* and in the heavy rate of sowing in soil (excepting the May sown crop), but it had no effect on post-emergence damping-off. Different methods of irrigation had no effect.

Ashour (W. A.). **Effect of sulphuric acid, fernasan and combined treatments on emergence of Cotton seeds.**—*Ann. agric. Sci., Cairo*, **2**, 1, pp. 251–255, 1957. [Arabic summary.]

At the Ain Shams University 0·25% fernasan seed treatment [see above] and the same preceded by 4 min. in H_2SO_4 significantly increased survival of Giza 30 fuzzy cotton, with averages of 222·56 and 190·67 plants compared with 157 for untreated and 127 for H_2SO_4 alone. No such increase was obtained with the non-fuzzy Ashmouny.

Ranney (C. D.) & Bird (L. S.). **Influence of fungicides, calcium salts, growth regulators, and antibiotics on Cotton seedling disease when mixed with the covering soil.**—*Plant Dis. Reptr*, **42**, 6, pp. 785–791, 1 fig., 1958.

Further tests at Texas Agricultural Experiment Station, College Station, on the control of cotton seedling diseases [cf. **36**, p. 761] showed that the effectiveness of some fungicides mixed with the covering soil (a fine, sandy, loam) at sowing is modified by pH or conditions associated with it. A mixture of captan, zineb, and PCNB (1½:2:1½ lb./acre) gave an almost uniform response over a relatively wide range of soil temp. and pH.

Presley (J. T.). **Relation of protoplast permeability to Cotton seed viability and predisposition to seedling disease.**—*Plant Dis. Reptr*, **42**, 7, p. 852, 1958.

At the Crops Research Division, U.S. Dept of Agric., the conductivity of distilled water in which cotton seed had been soaked for 15 min. at 50° C. was found to give a good estimate of viability, high electrical resistance being consistently associated with high germination rates in laboratory tests. Fungal growth was progressively more abundant and earlier on seed with lower resistance readings, this stimulation of fungi being associated with increased seedling disease hazard.

Van der Spek (J.). **De invloed der uitwendige omstandigheden op het effect van de ontsmetting van Lijnzaad.** [The influence of environment on the effect of Linseed disinfection.]—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 535–545, 1957. [English summary.]

In tests at the Laboratorium voor Phytopathologie, Wageningen, Holland, aatiram and aagrano seed dressings for controlling grey mould (*Botrytis* [? *cinerea*: **35**, p. 452]) on flax were compared with the antibiotic P. The frequency with which the flats were watered and the amount of water used had an essential bearing on the results. It appeared that antibiotic P at 1, 2, and 4 g./kg. seed gave the same result, none or only 1 diseased plant/400 seeds, when the flats were watered very moderately. When watered frequently the number of diseased plants increased to 4·5 with a dosage of 2 g./kg. Tests on *Aspergillus* agar established that the antibiotic disappeared in the soil much more slowly than the other dressings, being still detectable on the seed for at least 28 days after sowing. It is clear that rain determines how long the disinfectant will remain, whereas the soil moisture itself has little influence on the disappearance of the disinfectants.

The author considers that, contrary to prevailing opinion, spores play no direct role in the spread of the disease from the seed, which depends on the mycelium in the testa.

Compared with grey mould, foot rot (*Ascochyta* [? *linicola*: **35**, p. 185]) is less

effectively controlled by seed disinfection because emergence from infected seeds takes place more slowly and so the disinfectant must be present on the seed coat in a sufficiently high conc. for longer.

Hoffmann (B. M.). **Das Auftreten einer Anthraknose des Hanfes in Mecklenburg und Brandenburg.** [Occurrence of an anthracnose of Hemp in Mecklenburg and Brandenburg.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **12**, 5, pp. 96–99, 6 fig., 1958. [English and Russian summaries.]

In 1956 and 1957 heavy losses were caused in the hemp-producing areas of Mecklenburg and Brandenburg by a *Colletotrichum* sp. similar to *C. atramentarium*. The widespread, dark grey or black surface discolorations on mature plants were due to the eruption from the epidermis of numerous microsclerotia bearing setae. In the presence of sufficient moisture numerous spores were produced in slime droplets on the microsclerotia. In 1956 infection was established rapidly in the male plants and later in the female, in the damp warm weather prevailing after flowering. Affected stems became brittle and the periderm was easily removed.

Annual Report of the Jute Agricultural Research Institute (1956–57).—121 pp., Calcutta, 1958.

In the section [cf. **37**, p. 85] on mycology and plant pathology (pp. 41–52) it is stated that the incidence of anthracnose (*Colletotrichum corchorum*) was low during the season. Seedling mortality due to seed infection occurred in a pot trial. Of the fungicides tested, ceresan, both dry and wet, proved effective in checking the seedborne phase of the fungus.

The F_2 from JRC 412×D154 (*capsularis*), the parents, and the F_1 were grown in a field and inoculated by placing jute stem inoculum close to the collar and by spraying spores on suitable days. Where JRC 412 acted as female, stem rot (*Macrophomina phaseoli*) spots were present on at least 2 F_1 plants, but all 45 from the reciprocal remained free up to a late stage. JRC 918, a selection from an exotic type, was fairly resistant and superior to the standard D154.

It was confirmed that in areas infested by wilt [unidentified], incidence is lower following rotation with kalai (*Phaseolus mungo*) than with potato.

Iwata (Y.). **Phyllosticta aspidistrae Oud. and Macrophoma aspidistrae n.sp. on the leaf of Aspidistra elatior Blume.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 164–165, 4 fig., 1957. [Japanese. Abs. from English summary.]

Of these 2 fungi collected by the author in Tokyo, 1938, the second caused brown spots 1–3 mm. in diam., and had pycnidia 60–120 μ diam., and pycnospores 11–20× 6·5–12·5 μ.

Leiber (E.). **Viröse Krankheitserscheinungen an Knollenbegonien in einer Gärtnerei im Raume Frankfurt a.M.** [Virus disease symptoms on tuberous Begonias in a nursery in the district of Frankfurt-on-Main.]—*NachrBl. dtsch. PflSch-Dienst (Braunschweig), Stuttgart*, **10**, 5, pp. 70–72, 4 fig., 1958. [English summary.]

As the symptoms (ring spot and stunting) closly resembled those described by Noordam [**32**, p. 559], Pape [**34**, p. 151], and others for tomato spotted wilt virus on begonia it was assumed that this virus was responsible for the disease, although no tests were made.

Anzalone (L.) & Plakidas (A. G.). **Control of flower blight of Camellias in Louisiana with fungicides.**—*Plant Dis. Reptr*, **42**, 6, pp. 804–806, 1 fig., 1958.

Two soil drenches, each 300 lb./acre, of terraclor on plots artificially infested with sclerotia of *Sclerotinia camelliae* from camellia [cf. **37**, p. 44] completely inhibited the development of apothecia.

Anderson (C. W.). **Tobacco ringspot virus on florists' Hydrangea.**—*Plant Dis. Reptr*, **42**, 8, pp. 932–933, 1958.

Studies at Florida Agricultural Experiment Station, Gainesville, showed that a ring spot virus obtained from *Hydrangea macrophylla* was tobacco ringspot virus, the 1st report of this virus on hydrangea [cf. **36**, p. 406].

Ragetli (H. W. J.). **Onderzoekingen over een virusremstof voorkomend in Dianthus cariophyllus L.; werkingsspectrum, remmingsmechanisme en aard.** [Investigations of a virus inhibitor occurring in *Dianthus caryophyllus* L.; its activity spectrum, inhibitory mechanism, and nature.]—*Tijdschr. PlZiekt.*, **63**, 6, pp. 247–344, 6 fig., 4 graphs, 1958. [English summary, pp. 330–338. 42 refs.]

Comprehensive studies at the Landbouhogeschool, Wageningen, showed that the magnitude of the inhibiting action of expressed carnation sap on the transmission of 14 viruses (including tobacco mosaic and tobacco necrosis viruses [cf. **31**, p. 123; **36**, p. 649]) to 20 plant spp. by carborundum abrasion was independent of the length of time the two inocula were kept together beforehand, indicating that an interaction *in vitro* was improbable; furthermore, carnation sap from mosaic-infected plants was inhibitory after removal of the virus by centrifugation, confirming the independence of virus and inhibitor. The effect thus seemed attributable to host reaction, a view supported by the observed variation in the strength of the inhibitory action from one host sp. to another and confirmed by experiments in which inhibition was demonstrated in leaves dipped in carnation sap and rinsed in water before inoculation. It is suggested that the inhibitory activity blocks certain essential points near the leaf surface.

The inhibitor was largely precipitated by adding $(NH_4)_2SO_4$ to 50% saturation and further purified by open strip electrophoresis (as a semi-micro preparative method), yielding water-clear solutions of high concentration, which were examined in some detail.

The literature on the nature and action of naturally occurring plant virus inhibitors is reviewed in detail.

Schmidt (Trude). **Eine pilzliche Blattfleckenkrankheit an Margeriten verursacht durch Alternaria chrysanthemi n.sp.** [A fungal leaf spot disease of Chrysanthemum caused by *Alternaria chrysanthemi* sp. nov.]—*PflSchBer.*, **21**, 1–2, pp. 13–20, 7 fig., 1 graph, 1958. [English summary.]

A disease of *Chrysanthemum maximum* in the Austrian Tyrol affected all the green parts; round, initially pale grey spots enlarged rapidly to their final diam. of approx. 1 cm., and when fully developed were grey- to brownish-black, often with a pale fleck at the centre and a more or less distinct light and dark zonation. Where the spots were sufficiently numerous entire leaves withered. The pathogen, *A. chrysanthemi* Schmidt [no Latin diagnosis], has spores 25–127 × 10–26 (av. 70·9 × 14·4) μ. The symptoms were reproduced by inoculation.

Hackbarth (J.). **Beobachtungen über den Befall von Lupinus albus und Lupinus luteus mit Ceratophorum setosum Kirchn., dem Erreger der Braunfleckenkrankheit.** [Observations on the infection of *Lupinus albus* and *Lupinus luteus* by *Ceratophorum setosum* Kirchn., agent of brown spot disease.]—*Z. Pflkrankh.*, **65**, 3, pp. 143–149, 8 fig., 1958. [English summary.]

At the Max Planck Institut für Züchtungsforschung, Zweigstelle Scharnhorst, Germany, in the wet summer of 1956, *C. setosum* [*Pleiochaeta setosa*: **30**, p. 584] killed groups of young *L. albus* plants in breeding plots, in addition to producing the usual pod lesions on older plants. Seedling and pod infection also occurred in

an adjacent, late-sown stand of *L. luteus*, previously thought to possess a high measure of resistance [cf. **19**, p. 99].

Sygdomme og skadedyr på Roser i haven. [Diseases and pests of Roses in the garden.]—*Medd. Forsøgsv. Plantek. Kbh.* 598, 4 pp., 1958.

Brief notes on the symptoms and directions for the control of the following pathogens of roses in Denmark are given in popular terms: *Sphaerotheca pannosa*, *Diplocarpon rosae*, *Phragmidium mucronatum*, *Coniothyrium wernsdorffiae*, and rose mosaic virus.

Ela (Victoria M.). **Notes on diseases of Orchids in the Philippines.**—*Philipp. Agric.*, **41**, 10, pp. 531–537, 4 fig., 1958.

Descriptions are given of the following 3 fungus and 2 bacterial diseases: bacterial soft rot (*Erwinia carotovora*) [cf. **22**, p. 207], *Sclerotium* disease or basal rot (*S. rolfsii*) [cf. **17**, p. 750], *Phytophthora* black rot (*P. palmivora*) [cf. **7**, p. 100; **21**, p. 202; **25**, p. 502, and below], anthracnose (*Colletotrichum* sp. and *Gloeosporium* sp.) [cf. **32**, p. 256; **35**, p. 679], and bacterial brown rot, probably caused by *Pseudomonas cattleyae* [**26**, p. 59].

Thompson (A.). **A disease of Orchids caused by the fungus Phytophthora palmivora.**—*Maha Mag.*, **15**, 2, pp. 61–66, 2 pl., 1958.

At the University of Malaya, Singapore, the fungus causing brown rot of the leaves of hybrid orchid seedlings (Vanda Tan Chay Yan × *V. sanderiana*) and a large Vanda Tan Chay Yan plant was identified as *P. palmivora* [see above]. The symptoms were reproduced in a seedling sprayed with conidial suspension and kept in a moist chamber.

Graafland (W.). **Exobasidium japonicum op azalea.** [*Exobasidium japonicum* on Azalea.]—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 547–551, 1957. [English summary.]

Tests at the Willie Commelin Phytopathological Laboratory, Baarn, Holland, showed that pure cultures of *E. japonicum* (syn. *E. azaleae*) [**35**, p. 723] from azalea [*Rhododendron*] consist of blastospores. The symptoms of the disease caused by inoculation with these cultures were as observed in nature. Only the very young parts of the plant, especially the axillary buds at the moment of sprouting, are sensitive; therefore plants must be protected just after taking cuttings or after pruning.

Hey (G. L.). **Still time for a spray against mildew.**—*Grower*, **50**, 2, pp. 88–89, 1 fig., 1958.

The best control of apple mildew [*Podosphaera leucotricha*: cf. **37**, p. 541] and prevention of infection of next year's fruit buds has been obtained by high volume karathane sprays at not more than 14-day intervals from pink bud stage until mid-July: neither S nor low volume karathane sprays (on which more information is sought) were so successful. Records show that this disease, sometimes looked on as of modern development, was regarded as serious in Essex in 1928. Although it can attack pears also, it does not overwinter on them.

Hutton (K. E.) & Leigh (D. S.). **Dothiorella canker and dieback of Apple trees.**—*Agric. Gaz. N.S.W.*, **69**, 4, pp. 192–195, 6 fig., 1958.

Symptoms of the disease are described [cf. **26**, p. 342], followed by control recommendations. Control of limb cankers is achieved by providing adequate soil moisture and of shoot and spur blight by pruning out and burning infected material, and by spraying at green tip stage with Bordeaux mixture (10–10–100),

followed by thiram (1½ lb. of an 80% product/100 gal.) at petal fall and 3 and 6 weeks later. The routine use of DDT sprays reduces damage by pin hole borer (*Xyleborus pseudoangustatus*) and so the incidence of trunk cankers.

Bosch (E.). **Berostungen der Fruchthaut bei Äpfeln und ihre Ursachen.** [Russeting of Apple skin and its causes.]—*Schweiz. Z. Obst- u. Weinb.*, **67**, 10, pp. 265–272, 1 col. pl.; 11, pp. 292–298, 1 graph, 1958.

These studies have already been noticed [**37**, p. 240].

Burrell (A. B.). **Boron in Apple leaves and fruits as influenced by sodium pentaborate sprays.**—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 20–25, 1958.

Further tests in New York State [cf. **36**, p. 105] confirmed that in comparison with the high-to-low fluctuations of B content in fruit following 1 3-yearly soil application of borax, an annual spray of sodium pentaborate at 4 lb./acre maintained an adequate concentration and therefore seems preferable. Pre-harvest B content of fruit was not consistently correlated with midsummer leaf content.

Doepel (R. F.). **Pear scab.**—*J. Dep. Agric. W. Aust.*, Ser. 3, **7**, 3, pp. 329–334, 4 fig., 1958.

As a result of further spray trials the following schedule is recommended for the control of *Venturia pirina* [cf. **36**, pp. 192, 652]: at spur-burst and white bud, captan (1½–2 lb./100 gal.) or captan (1¼ lb.)+a phenyl mercury compound (¾ normal strength, not on var. Josephine nor on any var. after petal-fall); at bloom, captan (1½–2 lb.); at petal-fall, the same alternatives as at spur-burst; and after petal-fall, captan (1½–2 lb.) at intervals of 12–14 days. A supplementary application of 0·1% phenyl mercury chloride may be made between harvest and leaf-fall, but not when high temperatures prevail.

Locally, Bartlett, Josephine, and Packham's Triumph pears are very susceptible, while Kieffer is more resistant [cf. **33**, p. 93].

Griggs (W. H.) & Harris (R. W.). **Further studies on the effect of spray and dust materials on russeting of Bartlett Pears.**—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 45–56, 1 fig., 1958.

Tests carried out in the Mendocino and San Joaquin counties, California, over 4 yr. [cf. **35**, p. 25] indicate that sprays used against scab (*Venturia pirina*), insects, and mites, also Cu-lime dust and streptomycin used against blight (*Erwinia amylovora*) had no commercially significant effect on russeting, though blight treatments could cause increase if accompanied by low temp. The protective role of cloth bags on fruit and flowers [loc. cit.] suggests that the russet producing factor is probably associated with unfavourable weather conditions.

Eaks (I. L.), Eckert (J. W.), & Roistacher (C. N.). **Ammonia gas fumigation for control of Rhizopus rot on Peaches.**—*Plant Dis. Reptr*, **42**, 7, pp. 846–848, 1 graph, 1958.

At the University of California, Riverside, rot of peach fruits inoculated with *R. nigricans* [*R. stolonifer*: cf. **37**, p. 668] was controlled by fumigation with ammonia at high ambient concentrations. With less severe infection effective control could probably be obtained, without fruit injury, by 2 6-hour fumigations at 250 p.p.m.

Fujioka (Y.). **Morphological studies of Cornularia persicae (Schw.) Sacc., new to Japan.**—*Bull. Hiroshima agric. Coll.*, **1**, 1, pp. 23–26, 1 pl. 1958. [Japanese summary.]

A description is given of *C. persicae*, found on peach stems and twigs. The author discusses the taxonomy of the fungus and proposes to establish a new group, Pseudographiae, in the Stilbaceae, to include *Cornularia* and 4 other genera.

Reeves (E. L.) & Cheney (P. W.). **Differences in host reactions to K & S and western X-disease viruses.**—*Plant Dis. Reptr*, **42**, 8, pp. 925–927, 1958.

In further studies on the virus from Kwanzan and Shiro-fugen flowering cherries [**36**, p. 253], at present named 'K & S', the authors compared its behaviour with that of peach western X disease virus on peach, chokecherry (*Prunus virginiana* and *P. v.* var. *demissa* [*P. demissa*]), and sweet cherry. As peach and chokecherry reacted differently to peach western X virus and could not be infected with 'K & S', and as the 2 viruses differed in their reaction on sweet cherry, especially in foliage symptoms and ease of transmission, they are considered to be distinct.

Fridlund (P. R.) & Diener (T. O.). **The relationship between the necrotic ring spot virus, the reaction on Kwanzan flowering Cherry, and the green ring mottle virus.**—*Plant Dis. Reptr*, **42**, 7, pp. 830–832, 1958.

At the Irrigation Experiment Station, Prosser, Washington, symptoms on Kwanzan flowering cherry indicators inoculated with buds from *Prunus avium* were found to be caused by a virus distinct from that of necrotic ring spot [peach ring spot; **36**, p. 107; **37**, p. 413], which was also present in some of the *P. avium* trees but produced no symptoms in Kwanzan. Further observations suggested that the Kwanzan virus may be the same as that causing green ring mottle [sour cherry yellows virus (str.): **37**, p. 343] in Montmorency cherry. The symptoms in Montmorency can be produced in the absence of peach ring spot virus.

Die Sprühfleckenkrankheit der Kirschbäume. [Spray-spot disease of Cherry trees.] —*Schweiz. Z. Obst- u. Weinb.*, **67**, 14, pp. 362–364, 1 fig., 1958.

After stating that in Switzerland in recent years cherry trees, particularly in nurseries [**26**, p. 157], have been heavily attacked by *Cylindrosporium padi*, the author briefly describes symptoms and control measures.

Lockhart (C. L.). **Studies on red leaf disease of lowbush Blueberries.**—*Plant Dis. Reptr*, **42**, 6, pp. 764–767, 1 graph, 1958.

Exobasidium vaccinii was isolated from the leaves of lowbush blueberries (*Vaccinium myrtilloides* and *V. angustifolium* vars. *laevifolium* and *nigrum*) with red leaf, a systemic disease which occurs in the U.S.A. from Maine to New Jersey and in E. Canada where it has recently become serious in newly developed fields in Nova Scotia. Min., opt., and max. temps. for growth of the fungus were 6·5, 20–24, and 32·8° C., 21° being opt. for spore germination. The pathogen grew down the stem into the rhizome; red leaf symptoms did not develop on inoculated leaves but appeared after 3 months on branches arising from the main stem and after 7 on shoots from the rhizome. The number of infected shoots increased between the 1st and 2nd crop years, some of them dying each year, and fruit set was reduced. The only means of control at present is eradication of the diseased plants with a herbicide.

McKeen (W. E.). **Blueberry canker in British Columbia.**—*Phytopathology*, **48**, 5 (1), pp. 277–280, 10 fig., 1958.

This is an account from the University of British Columbia, Vancouver, of a disease of blueberries [*Vaccinium* spp.], now increasingly cultivated in B.C. from New Jersey stock, caused by *Godronia cassandrae* [cf. **33**, p. 709 and below]. Incipient lesions appear in winter, often around a leaf scar, and enlarge and coalesce in spring, becoming black and bearing pycnidia. Infected stems wilt in the summer, generally dying above the canker. Var. Jersey is the most susceptible; Rubel and Rancocas are the most resistant. There is no weed host in the area concerned.

The fungus is also pathogenic to cranberries in E. United States [**9**, p. 257], but as blueberry canker does not occur there different strains appear to be involved;

conidia of the cranberry isolate were non-pathogenic to blueberry and were straighter and larger than those from blueberry. In addition, the slow maturation in summer, which delays hardening, and later harvest may promote the canker in B.C. No control measure is effective other than destruction of diseased wood.

Creelman (D. W.). **Fusicoccum canker of the highbush Blueberry especially with reference to its occurrence in Nova Scotia.**—*Plant Dis. Reptr*, **42**, 7, pp. 843–845, 1958.

Canker caused by *F. putrefaciens* is the most important disease of blueberry (*Vaccinium corymbosum*) in Nova Scotia. The pathogen is identical with the one causing end rot of cranberry (*V. macrocarpon*). Apothecia were found on living blueberry plants near the soil surface and on prunings, a connexion between these and the *Fusicoccum* being demonstrated in culture. Though *F. putrefaciens* has been assigned to *Godronia cassandrae* [**9**, p. 257 and above] there are distinctions that may serve to place it in a separate species or even genus.

Van der Meer (F. A.). **Overdracht van Frambozevirussen door bladenting.** [Transmission of Raspberry viruses by leaf grafting.]—*Tijdschr. PlZiekt.*, **64**, 3, pp. 273–275, 1 fig., 1958. [English summary.]

At the Instituut voor Plantenziektenkundig Onderzoek, Wageningen, raspberry leaf mottle [black raspberry necrosis] virus and raspberry [moderate] vein chlorosis virus [**31**, p. 614] were transmitted by a leaf grafting method [**36**, p. 255], modified by the use of sticking plaster, which is quicker than bottle grafting and suitable for use with small plants.

Stace-Smith (R.). **Studies on Rubus virus diseases in British Columbia. V. Thimbleberry ringspot.**—*Canad. J. Bot.*, **36**, 3, pp. 385–388, 1 pl., 1958.

A further study in this series [cf. **37**, p. 173] describes a disease of thimbleberry (*R. parviflorus*) in which irregular ring spot markings appear on the foliage, varying in intensity on individual leaves and plants, and sometimes causing leaf distortion and stunting of the plants. The causal virus was transmitted by grafting to black and red raspberry and to *R. henryi*; 3 spp. of *Amphorophora* proved to be vectors, but not *A. rubi*.

McKeen (W. E.). **Races of and resistance to Phytophthora fragariae.**—*Plant Dis. Reptr*, **42**, 6, pp. 768–771, 1958.

Nine isolates of *P. fragariae* from strawberries in the Saanich peninsular of Vancouver Island varied widely in their pathogenicity to common strawberry vars. and one from loganberry in the same area was the least infectious [**37**, p. 492]. There is a possibility of new races [see below] appearing in an infested soil after the planting of resistant vars. British Sovereign and Perle de Prague were resistant to certain isolates.

Converse (R. H.), Scott (D. H.), & Waldo (G. F.). **Two additional races of Phytophthora fragariae Hickman in Maryland.**—*Plant Dis. Reptr*, **42**, 7, pp. 837–840, 1958.

Five physiologic races of *P. fragariae* [see above] have been found in Maryland, 4 of them in strawberry field soils tested in the greenhouse on a range of host varieties. The designation A(merican)-1 is suggested for the 'common race' severely infecting only completely susceptible strawberries like Blakemore; A-2 for A [**29**, p. 469], pathogenic also to Md. 683; and A-3 for S [loc. cit.], infecting Aberdeen. A-4, to which Del Norte (*Fragaria chiloensis*) is susceptible, and A-5, infecting the strawberry var. Stelemaster, were previously undescribed.

Felix (E. L.). **A Phytophthora blight and root rot of Strawberry. Phytophthora blight of Strawberry.**—*Plant Dis. Reptr*, **42**, 6, pp. 818–819; 7, pp. 841–842, 1958.

Tennessee Beauty strawberry plants in a field near Portland, Tennessee, developed root rot and blight of the buds, flowers, and leaves. An unidentified *Phytophthora* sp. found on all affected parts differed from *P. fragariae* in having papillate sporangia, infecting tomato fruits, and growing readily on potato-dextrose agar. No vascular discoloration was observed.

In the second paper the disease is reported from a number of fields in middle, E. and N.E. Tennessee. Infected plants are apparently never killed; fruits are seriously rotted, the green ones becoming black, dry, and hard. Oospores are produced abundantly in the calyx and fruit and in culture. Antheridia are predominantly paragynous and the fungus may be identical with or related to *P. cactorum* [**4**, p. 100; **35**, p. 159].

Newton (W.) & Van Adrichem (M. C. J.). **Resistance to Verticillium wilt in F_1 generations of self-fertilized species of Fragaria.**—*Canad. J. Bot.*, **36**, 3, pp. 297–299, 1958.

In trials at the Plant Pathology Laboratory, Saanichton, British Columbia, to obtain strawberry breeding material resistant to *V.* [*albo-atrum*: cf. **35**, p. 29] it was found that the F_1 generation of selfed plants of *F. chiloensis*, *F. ovalis*, and *F. yukonensis* contained resistant seedlings and some from *F. orientalis* were markedly tolerant.

Van Adrichem (M. C. J.) & Bosher (J. E.). **Leaf blotch and petiole blight of Strawberry caused by Gnomonia fructicola.**—*Plant Dis. Reptr*, **42**, 6, pp. 772–775, 5 fig., 1958.

At Saanichton, British Columbia, *G. fructicola* [cf. **35**, p. 159] was found on Sierra strawberries in 1957. Infection has since become severe in some Vancouver Island plantations, where losses are probably increased by the use of sprinkler irrigation, sawdust mulches which maintain high humidity, and cessation of the practise of burning straw mulches, thus allowing accumulation of inoculum.

Newhall (A. G.). **The incidence of Panama disease of Banana in the presence of root knot and the burrowing nematodes (Meloidogyne and Radopholus).**—*Plant Dis. Reptr*, **42**, 7, pp. 853–856, 2 fig., 1958.

In an experiment at Changuinola, Panama, using steamed soil heavily infested with *Fusarium oxysporum* f. *cubense* over 100% more Gros Michel banana plants developed symptoms of Panama disease when *R. similis* was added to the soil (38% infection in soil infested only with the fungus), whereas addition of *M.* sp. caused no increase in the disease over the same period (3 months).

Stover (R. H.). **Studies of Fusarium wilt of Bananas. II. Some factors influencing survival and saprophytic multiplication of F. oxysporum f. cubense in soil. III. Influence of soil fungitoxins on behaviour of F. oxysporum f. cubense in soil extracts and diffusates.**—*Canad. J. Bot.*, **36**, 3, pp. 311–324, 1 fig., 1 graph; 4, pp. 439–453, 2 pl., 1 fig., 1958.

Some of the results of this further study in Honduras [cf. **36**, p. 478] have already been noticed [**37**, p. 456]. The soil plate technique was used as before and nutrients were also added to 225 ml. lots of inoculated soil in glass tumblers. In soils moistened with fresh banana sap, populations of *F. o.* f. *cubense* were generally 2–5 times greater than with solutions of 1% glutamic acid or dextrose. Populations declined more rapidly in soils air-dry at inoculation and moistened immediately afterwards than in those initially moist.

In aqueous soil extracts and in soil amended with glutamic acid or banana sap, CO_2 increased the multiplication of the fungus [loc. cit.]. Lowering oxygen to 4% in N containing 4% CO_2 did not tend to reduce multiplication and survival. Differences in the degree of multiplication in different soil types were generally more consistent with excess CO_2 than in normal air; multiplication was also greater in soil flood-fallowed or subjected to anaerobiosis than in soil not so treated.

The results indicate that *F. o.* f. *cubense* can behave as a soil inhabiting saprophyte with parasitic potential [cf. **34**, p. 655] and has probably developed a strain adapted to bananas, spreading with the extension of this crop.

Germination [**37**, p. 669], hyphal growth, sporulation, and chlamydospore formation in culture were inhibited by different soil extracts and diffusates, the alkaline clays being more fungitoxic than the acid loams irrespective of the extract pH. Inhibition could be reduced by filtering extracts through charcoal, sintered glass, or Seitz filters, by evaporating or dialysing, by air drying the soil before extracting, or by heat sterilization or fumigation with ethylene oxide. High nutrient status masked the toxic effects and low concentrations reduced them, sporulation and chlamydospore formation generally being more sensitive to toxins and nutrients than hyphal growth. In all extracts the yellow clone of the fungus [**37**, p. 97] germinated and grew more vigorously than the non-yellow. There was a strong indication that the fungitoxins were associated with the bacterial soil flora.

Dunegan (J. C.). **The Banana demonstration tour of Jamaica.**—*J. agric. Soc. Trin. Tob.*, **57**, 4, pp. 459–482, 1957.

Reference in this report, published through the Caribbean Commission Publications Exchange Service, to the control of banana leaf spot [*Mycosphaerella musicola*: **37**, p. 670] notes that oil spraying is done by helicopters [**37**, p. 362] or by machine-driven knapsacks with nozzles fixed at 45° to the vertical, applying 1¼ gal./acre and covering 20 acre/day. Growers are charged 6*s.*/acre/application, covering labour and depreciation; oil is supplied by the Growers' Association, financed by a levy on fruit exported.

Severe leaf and fruit scorching may occur, when sprays are applied at the end of irrigation cycles, or during periods of very high temp. Such injury is attributed to the impact of the oil drops on leaf and fruit surfaces rather than the temp. of the oil. Better dispersion was obtained by helicopter application, at a rate rather under 1½ gal./acre, at 80 lb./sq. in. (droplet size 50–150 μ), from helicopters with a pay load of 40 gal. flying at 40–50 m.p.h. 25 ft. above the bananas, to cover a 60 ft. swath at 1 acre/11 sec., at a cost of 10*s.*/acre/application (excluding the oil).

Balatsouras (G. D.) & Vaughn (R. H.). **Some fungi that might cause softening of storage Olives.**—*Food Res.*, **23**, 3, pp. 235–243, 1958.

At the Dept of Food Technology, University of California, Davis, a study was made of 35 moulds and 1 streptomycete isolated from surface growths on olives stored out-of-doors. The majority of the cultures (23) were allocated to *Fusarium oxysporum*, *F. moniliforme* [*Gibberella fujikuroi*], *F. lateritium* [*G. lateritia*], *F.* '*roseum*', *F. gibbosum*, and *F. solani*, while 4 each were referred to *Penicillium chrysogenum* and *P. notatum*. The genera *Aspergillus*, *Oospora* (*Geotrichum*), *Paecilomyces*, and *Verticillium* were each represented by single cultures.

From the results of investigations on the pH tolerance of the organisms, their resistance to salt, and capacity for lactic acid decomposition and degradation of cellulose and pectin it appears probable that none would be restricted in growth by the pH values (3·5–4·5) of the brines or the amount of salt (5–8%) contained in them. Lactic acid was utilized as a source of carbon in a mineral salts solution and all except *V.* and *Streptomyces* spp. softened a polypectate gel medium. Only the *F.* spp. assimilated cellulose. It is concluded, therefore, that most, if not all, of

the species under observation may be regarded as potential agents of spoilage of olives stored in brine.

Hein (M. A.). **Registration of varieties and strains of Grasses.**—*Agron. J.*, **50**, 7, pp. 399–401, 1958.

Lamont rescue grass (*Bromus catharticus*: Reg. No. 7) was resistant to inoculation with chlamydospores of *Ustilago bullata* [cf. **31**, p. 124] from collections in Alabama, Georgia, Mississippi, and Texas, but moderately susceptible to a collection from Louisiana. This var. was first released in 1957 for production of certified seed.

Rutherford (A. A.). **The susceptibility of Perennial Ryegrass to blind seed disease.**—*J. Brit. Grassl. Soc.*, **11**, 1, pp. 66–70, 1956. [*Biol. Abstr.*, **32**, 8, p. 2386, 1958.]

In an experiment in which strains of rye grass [*Lolium* sp.] were maintained at 2 levels of fertilization blind seed disease [*Gloeotinia temulenta*: cf. **37**, p. 363] and poor germination (due to that disease and to other factors) were found to be associated with lack of fertilizer. Indigenous strains were less susceptible than the pedigree, and early strains than late.

Ramazanova (Mme S. S.). Изменчивость возбудителя цветочной плесени Клевера **(Botrytis anthophila A. Boud.).** [Variability of the causal agent of flower mildew (*Botrytis anthophila* A. Boud.) in Clover.]—Узбек. биол. Журн. [*Uzbek. biol. Zh.*], *1958*, 3, pp. 19–24, 1958. [Uzbek summary.]

Isolates of *B. anthophila* [**37**, pp. 592, 645] from 5 regions of U.S.S.R. with entirely different climatic conditions were tested for their variability on different clover spp. Using different culture media and inoculating under different conditions (field and greenhouse), cultural, morphological, and pathogenic differences were apparent, the Leningrad strain being the most virulent and the one from Bashkir A.S.S. the least.

In pure culture with K deficiency the colonies were yellowish grey and rough with different conidial formation. In inoculation tests with this K deficient strain and the original, the former was more virulent, infecting 29 out of 30 plants compared with the 21 infected by the original. Reisolation tests showed that the mutant preserved its characteristics in the following generations.

Weltzien (H. C.). **Stengelbrenner (Kabatiella caulivora (Kirch) Karak.) an Alexandrinerklee.** [Stem scorch (*Kabatiella caulivora* (Kirch) Karak.) on Alexandrian Clover.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **10**, 5, pp. 72–74, 5 fig., 1958. [English summary.]

In S.W. Germany [cf. **36**, p. 248] *K. caulivora* causes heavy losses of *Trifolium alexandrinum*, a crop of increasing importance in Germany.

Cole (H.) & Couch (H. B.). **Etiology and epiphytology of northern anthracnose of Red Clover.**—*Phytopathology*, **48**, 6, pp. 326–331, 1 fig., 1958.

Further details from Pennsylvania State University, University Park, of a study of *Kabatiella caulivora* [**36**, p. 594]. The fungus was recovered from diseased material stored outdoors for 400 days, but not after 450 days, and from both sterilized and unsterilized soil after periods up to 300 days. Conidia on dry coverslips survived 380 days at 3, 6, and 9° C., and 20 months at −10°. Infection of the Penscott var. occurred in 1 test when plants were kept in a moist chamber for 3 hr. after inoculation and the percentage increased up to 60 hr. exposure, the max. tested. The opt. temp. for infection was 20–23° in the moist chamber. Plants sprayed with suspensions containing less than 125,000 spores/ml. were not infected. Spore germination began 15 hr. after inoculation, appressoria appeared in 48 hr.,

and penetration took place 48–96 hr. after inoculation, followed by inter- and intracellular growth of the fungus, and macroscopic symptoms were visible in 8 days at 20°. Lesions appeared on stems and petioles, sporulating after 10–20 days. All above-ground parts become infected and the disease is seed-borne.

KREITLOW (K. W.) & HUNT (O. J.). **Effect of Alfalfa mosaic and Bean yellow mosaic viruses on flowering and seed production of Ladino White Clover.**—*Phytopathology*, **48**, 6, pp. 320–321, 1958.

At Beltsville, Maryland, mixed virus infection by lucerne mosaic and bean yellow mosaic reduced the flowering of a clone of Ladino clover [**36**, p. 766] in the greenhouse by 31·7%, that of 2 clones in the field by 20·3 and 43·9, and seed yield of the field clones by 29·2 and 53·7. Viability of seed from virus-infected and healthy plants was the same and there was no indication of seed transmission.

RIBALDI (M.) & PANELLA (A.). **On bacterial wilt of Alfalfa (Medicago sativa L.) caused by Corynebacterium insidiosum (McCull.) Jensen, in Italy.**—*Euphytica*, **7**, 2, pp. 179–182, 1 fig., 1958. [Dutch summary.]

In 1957 the authors found bacterial wilt (*C. insidiosum*) [map 67] affecting 2–3-yr.-old stands of lucerne in Bologna, this being the 1st record of the disease for Italy. At the Agricultural College of the University of Perugia a breeding programme has been started, using resistant American material, and methods are being developed for testing resistance under Italian conditions [cf. **37**, p. 102].

LEACH (C. M.) **A disease of Dodder caused by the fungus Colletotrichum destructivum.**—*Plant Dis. Reptr*, **42**, 7, pp. 827–829, 2 fig., 1958.

C. destructivum was isolated from an unidentified *Cuscuta* sp. parasitizing lucerne in Oregon. In a greenhouse test the fungus produced brown necrotic lesions on *C. epithynum* and *C. campestris* needle inoculated with a spore suspension but did not infect lucerne.

RADEMACHER (B.), WEIL (B.), & NUBER (K.). **Untersuchungen über Krankheitserscheinungen an Hopfen (Humulus lupulus L.) im Tettnanger Anbaugebiet.** [Investigations of disease symptoms on Hops (*Humulus lupulus* L.) in the Tettnang region.]—*Z. PflKrankh.*, **65**, 5, pp. 272–279, 5 fig., 1958.

In recent years in the hop-growing region of Tettnang, Bodensee, Germany, a disease, mostly affecting the early var. Tettnanger-Schwetzinger, has been increasing in importance: symptoms include rigidity of the vines; stunting, with shortening of the internodes; and malformation of the leaves, which become brittle and yellowish-brown.

In exudates from diseased leaves examined under the electron microscope were rodlike particles of fairly uniform length [not specified], presumed to be of a virus nature and absent from healthy leaves.

Inoculation of sap from diseased plants into a number of test plants produced no symptoms.

MATZNER (F.). **Der Einfluß einer Düngung mit Chloriden und Sulfaten in Verbindung mit Calcium auf den Ertrag und die Samenqualität bei Mohn (Papaver somniferum L.) unter Berücksichtigung des Befalls durch Helminthosporium papaveris nach Hennig.** [The influence of fertilizing with chlorides and sulphates in conjunction with calcium on the yield and seed quality of Poppy (*Papaver somniferum* L.) in relation to infection by *Helminthosporium papaveris* according to Hennig.]—*Wiss. Z. Friedrich-Schiller-Univ.*, **7** (*1957–1958*), pp. 295–303, 7 graphs, 1958.

In experiments at the Institut für Acker- und Pflanzenbau, Friedrich-Schiller-

University, Jena, Germany, soil amendments with KCl led to heavy infection of opium poppy by *H. papaveris* [*Pleospora calvescens* or *P. papaveracea*: **35**, p. 115] in the absence of lime on a loess soil. K_2SO_4 exerted no differential effect on the fungus, but lime (as $CaCO_3$, 10 dz./ha.) appreciably reduced the losses [cf. **31**, p. 257].

Khazaradze (E. P.). Фомопсис Хурмы — рак Хурмы **(Phomopsis diospyri Boug.)** в условиях Грузинской ССР. [*Phomopsis* on Dates—Date canker (*Phomopsis diospyri* Boug.) under the conditions of the Georgian S.S.R.]—*Trud. Inst. Zashch. Rast. Acad. Sci. Georgia*, **12**, pp. 153–175, 8 fig., 1957. [Georgian. Abs. from Russian summary.]

In western Georgia, U.S.S.R., infection by *P. diospyri* [cf. **20**, p. 381] has reached epiphytotic proportions since it was first recorded in 1946. The fungus attacks the fruit at all stages. The disease is sometimes arrested by applications of thiram or Bordeaux, both at 1%, in early Apr., May, early June, late Aug., and early Sept. Cutting out the infected parts, if superficial, and treating the wounds with 5% copper sulphate is also effective but should be done only in early spring and late autumn. Mechanical injuries should be avoided. The disease has been excluded from nurseries by quarantine.

Bachy (A.). **Le 'blast' des pépinières de Palmier à l'Huile. Observations et moyens de lutte.** ['Blast' in Oil Palm nurseries. Observations and control methods.]—*Oléagineux*, **13**, 8–9, pp. 653–660, 7 fig., 1 graph, 1958.

In a small-scale preliminary experiment at the Institut de Recherches pour les Huiles et Oléagineux, La Mé, Ivory Coast, permanently shaded oil palm beds given increased shading from Nov. (onset of the dry season) and transplanted in Mar. had only 18% blast [**37**, p. 366] in Jan. 1957 compared with 64% in 3 unshaded beds. In an extended test with 30 blocks of 48 plants the percentage incidence in late Feb. in plants shaded throughout the season was 3·9, in those not shaded 30·9, and in others receiving shade only up to mid-Aug. 32·1, to 1 Oct. 40·5, to 1 Nov. 37·1, and to 1 Dec. 32·2. It is recommended that nurseries be shaded from 1 Oct. to the end of Feb., and that care be taken to have the minimum number of plants at the 6–8 month stage (the most susceptible) from 1 Nov.

Many other experiments, testing the effect of pH, root wounding, root contact, soil sterilization and disinfection, and cultural practices were without effect on the disease, which is very widespread but varies in intensity. One nursery in the Ivory Coast suffered an 80% loss in 1956.

Prévot (P.) & Ziller (R.). **Relation entre le magnésium du sol et de la feuille de Palmier.** [Relationship between magnesium in the soil and in the Palm leaf.]—*Oléagineux*, **13**, 8–9, pp. 667–669, 3 graphs, 1958. [English summary.]

The level of water-soluble Mg in top soil (0–20 cm.) at Lebango and Etoumbi, French Congo, was found at the Institut de Recherches pour les Huiles et Oléagineux to be closely related to that in oil palm leaves and to visible symptoms of deficiency [**37**, p. 300]. Top soil Mg levels below 15 p.p.m. are to be regarded as highly deficient.

Gigante (R.). **La situation des maladies provoquées par les virus des Pommes de terre en Italie.** [The situation as regards virus diseases of the Potato in Italy.] —*Boll. Staz. Pat. veg., Roma*, Ser. 3, **15** (*1957*), 1, pp. 33–38, 1958.

In this paper, read at the Third Conference on potato virus diseases, Lisse, Wageningen, June 1957 [cf. **35**, p. 479], the author outlines the steps taken in Italy since 1947 to obtain home-grown, virus-free seed potatoes [cf. **36**, p. 718; **37**, p. 301, *et*

passim], special reference being made to the work of the local Centres of Multiplication of the Potato and the Centre of Studies of the Potato. In many seed potato stocks virus infection now does not exceed 1%.

MÜNSTER (J.). **L'importance des infections primaires de viroses dans une culture de plantes de Pommes de terre.** [The importance of primary infections by virus diseases in a planting of seed Potatoes.]—*Rev. rom. Agric.*, **14**, 6, pp. 45–47, 2 fig., 1958.

The author presents the results of observations at the Stations Fédérales d'Essais Agricoles, Lausanne, on symptoms of potato leaf roll virus, virus Y, and its necrotic strain in field plants in relation to subsequent infection of the tubers. It is concluded that by the time primary symptoms are evident almost all the tubers are infected. The 3rd inspection (in Aug.) appears to be of particular importance in detecting infections manifested only by late symptoms.

MYGIND (H.). **Kartoffelbrok. En samlet oversigt.** [Potato wart. A collective survey.]—58 pp., 7 fig., 4 maps, Statens Plantetilsyn, Copenhagen, 1957. [68 refs.].

This useful manual of practical instruction comprises sections on the symptomatology, etiology, and biology of *Synchytrium endobioticum*; information on varietal reactions, including the methods of assay devised by Spieckermann [**3**, p. 600] and Lemmerzahl [**9**, p. 738], and on physiologic races; a tabulated survey of the geographical distribution of the pathogen, with details concerning Scandinavia and U.S.A.; the various modes of infection and control; and legislation in Denmark and abroad.

TAKASE (N.) & TAKAKUWA (M.). **The designation according to the international system of pathogenic races of Phytophthora infestans and of genes for resistance to late blight in Japan.**—*Ann. phytopath. Soc. Japan*, **22**, 2, pp. 79–82, 1957. [Japanese. Abs. from English summary.]

The 3 potato races of *P. infestans* isolated in Japan [**37**, p. 106] are classified according to the international system [**33**, p. 250] as 0, 1, and 4; Takase's gene for resistance R_a is identified with the international gene R_1 [cf. **37**, p. 370].

TOMIYAMA (K.). **Cell physiological studies on the resistance of Potato plants to Phytophthora infestans. V. Effect of 2,4-dinitrophenol upon hyper-sensitive reaction of Potato plant cell to infection by Phytophthora infestans. VII. Growth of intracellular hyphae of Phytophthora infestans in the living Potato plant cells which are resistant or susceptible to the infection of them. VIII. The influence of a pre-infectional heat treatment on the resistance of Potato plant to Phytophthora infestans.**—*Ann. phytopath. Soc. Japan*, **22**, 2, pp. 75–78, 1 graph; 3, pp. 129–133, 1 fig., 1 graph; 4–5, pp. 237–242, 3 graphs, 1957. [V and VII Japanese. Abs. from English summaries.]

No. V. of this series [cf. **37**, p. 106] describes how petioles of Hokkai No. 10 were inoculated with zoospores of race 0 of *P. infestans* [cf. **37**, p. 504] to which it is highly resistant. When infection hyphae were beginning to extend into host cells $2\frac{1}{2}$ hr. later, 2,4-dinitrophenol (DNP) [see below] was vacuum infiltrated into the infected tissues, which were left in the solution for 30 min. and then kept at 19–20° C. Vital staining with neutral red and protoplasmic streaming (inhibited by DNP as is oxidative phosphorylation) indicated that DNP markedly delayed the death of the invaded cells, suggesting that accelerated streaming after infection is correlated with the death of the cell.

In VII it is reported that after inoculation of 5 potato vars., representing differ-

ent resistance types, with races 0, 1, 4, and 1,4, penetration and death of infected cells occurred 2–2½ and 10–15 hr., respectively, after inoculation; differences in the rate of hyphal growth in living cells were significant between races but not between vars., nor was the interaction between vars. and races significant. Even in resistant vars. the growth of intracellular hyphae of *P. infestans* does not appear to be inhibited within about 4 hr. of penetration.

Experiments described in VIII showed that exposure to 45–53·5° C. for 5 min. considerably reduced the resistance of petiole and tuber tissue of var. 41089–8, but had no effect on the rate of penetration and growth of the hyphae. It also delayed the necrogenous reaction of tissue to infection by an incompatible race of the fungus, and the hypersensitive death of cells. The R.Q. of the tissue remained unchanged but the respiration rate was reduced considerably. The evidence obtained pointed to a close association between the metabolic activity of the cells and their hypersensitive death.

YAMAMOTO (M.). **Investigations by means of phase-contrast and polarisation microscopes on the penetration of Phytophthora infestans into the suscept plants.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 148–152, 3 pl., 1957. [Japanese summary. 26 refs.]

Cyto-physiological investigations at the Shimane Agricultural College, Japan [cf. **37**, p. 107], showed that in the early stages of penetration into potato leaf cells protoplasmic strands appeared in infected cells of resistant vars., streaming was accelerated, and the nucleus moved towards invasion hyphae in both resistant and susceptible vars.

Birefringence of cells surrounding the infection point in resistant vars. was intensified by alcohol and diminished by glycerin and DNP [see above]. The author suggests that the rapid streaming in resistant vars. is due to the acceleration of energy cycles and that a change of micellar structure could take place on infection.

SAKAI (R.). **Physiological studies on Phytophthora infestans (Mont.) De Bary. Part 9. On the physiological properties of amylase. Part 10. Effects of ultraviolet radiation.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 134–138, 5 graphs; 4–5, pp. 211–214, 2 fig., 1 graph, 1957. [Japanese. Abs. from English summaries.]

In part 9 [cf. **37**, p. 143] the opt. pH for saccharogenic and dextrogenic activities of the amylase of *P. infestans* is stated to be 6–7 and the opt. temp. 40° C.; both were inactivated by heating the mycelial extract at pH 7 at 40° for 15 min. though this treatment at pH 3·5 followed by neutralisation did not completely inhibit the saccharogenic activity. It was therefore concluded that the amylase was mostly composed of α-amylase with a little saccharifying enzyme.

In part 10 it is reported that direct irradiation of race 0 cultures with 1850–5780 A for 30 sec. decreased the growth rate while 60 sec. was lethal to aerial mycelium. Indirect exposures of 5 min.–6 hr. had no detrimental effects, and sporulation was increased by 10 sec. direct and 5–10 min. indirect irradiation.

TOXOPEUS (H. J.). **Some notes on the relations between field resistance to Phytophthora infestans in leaves and tubers and ripening time in Solanum tuberosum subsp. tuberosum.**—*Euphytica*, **7**, 2, pp. 123–130, 1958. [Dutch summary.]

From studies at the Institute of Agricultural Plant Breeding, Wageningen, of the correlation between field resistance of potato foliage, field resistance of tubers, and ripening time it seems to be difficult to combine earliness with a high degree of foliage resistance [**36**, p. 346]. This holds true only for the *tuberosum* ssp.

There is not such a close correlation between ripening time and tuber resistance. Preliminary experiments indicated that the skin of the tuber is often an important

barrier to penetration by the fungus. The defence reaction of the flesh is also important.

Schmidt (Herta) & Schwartz (Erika). **Untersuchungen über die gemeinsame Bekämpfung von Kartoffelphytophthora und Kartoffelkäfer mit Mischungen von modernen Fungiziden und Insektiziden.** [Studies of the combined control of Potato *Phytophthora* and Potato beetle with mixtures of modern fungicides and insecticides.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **12**, 6, pp. 101–106, 1 graph, 1958. [English and Russian summaries.]

At the Biologischen Zentralanstalt, Berlin, when copper oxychloride, used against *P. infestans*, was mixed with insecticides based on DDT and HCH [BHC], for the control of Colorado beetle, neither material was adversely affected by the combination.

Van Emden (J. H.). **Waarnemingen betreffende het parasitisme van Pellicularia filamentosa (Pat.) Rogers (= Rhizoctonia solani Kühn) ten opzichte van de aardappelplant.** [Observations on the parasitism of *Pellicularia filamentosa* (Pat.) Rogers (= *Rhizoctonia solani* Kühn) on the Potato plant.]—*Tijdschr. PlZiekt.*, **64**, 3, pp. 276–281, 2 fig., 1958. [English summary.]

In field studies at the Instituut voor Plantenziektenkundig Onderzoek, Wageningen, *R.* [*Corticium*] *solani* [cf. **37**, p. 504] was often found on symptom-free potato plants; lesions, where present, were restricted to stems and stolons. The roots of plants growing *in vitro* in Knop agar inoculated with the fungus were immune from attack until the death of the stems, lesions occurring on the stems and leaves only. In such plants growing in autumn in a greenhouse at 20° C. infection of the sprouts occurred within 7–10 days, or, under artificial lighting, in 4 weeks. In spring, with abundant daylight, the plants were highly resistant at 15°; infection was slight at 18° and severe at 22°. Adding saccharose to the medium led to heavy fungal growth associated with poor growth of the sprouts, but the number of infections did not increase.

Neofitova (Mme V. K.). Бугорчатая парша (ооспороз) клубней Картофеля, вызываемая грибком **Oospora pustulans Ow. & Wak.** [Pustular scab (oosporosis) on Potato tubers, caused by the fungus *Oospora pustulans* Ow. & Wak.]—Бот. Журн. [*J. Bot. U.S.S.R.*], **42**, 6, pp. 921–924, 1957. [Abs. from *Referat. Zh. Biol. 1958*, 7, p. 191, 1958.]

A report from the Murmansk region records a 10–25% loss of potato tubers from *O. pustulans* [**33**, p. 111]. Infection starts in Nov. and reaches its peak in Feb.–Mar. Drying the tubers before storage reduced infection by 35–55%.

Rodríguez (R. A.). **'Torbo', a tropical disease of Potatoes.**—*Plant Dis. Reptr*, **42**, 8, pp. 972–980, 9 fig., 1958.

This disease sometimes causes 50% loss. It is attributed by the Ministerio de Agricultura e Industrias, San José, Costa Rica, to *Rosellinia* sp., which also attacks other crops, including cauliflower, beet, and carrot, and certain weeds. The underground parts of potato plants rapidly become covered with a white, fan-like growth of mycelium ('white torbo'), and rotting and wilting may follow. Below this mat a dark, rugose, netted crust forms in 5–6 days ('black torbo') from which the cortex is invaded, though not as a rule the pith. Varying degrees of pathogenicity shown by different isolates indicate that more than 1 strain occurs. The fungus persists in sclerotial form in crop residues; its attack is followed by secondary organisms. Control was achieved in the dry season with two 3-weekly soil drenches of terraclor at 250 kg. or vapam at 100 l./ha., but these were less effective in wet weather.

Bonde (R.) & Johnson (Barbara). **Studies on the additive effect of streptomycin sulfate on different seed Potato disinfectants for the control of bacterial ring rot.**—*Plant Dis. Reptr*, **42**, 6, pp. 781–784, 1958.

At Maine Agricultural Experiment Station, Orono, seed potato pieces inoculated with *Corynebacterium sepedonicum* [**36**, p. 719; **37**, p. 505] were dipped for 5 min. in solutions of various disinfectants alone or plus 100 p.p.m. streptomycin sulphate [cf. below]. Actidione and phytomycin were the most effective in reducing infection of field plants from treated pieces, though the former caused some injury. Streptomycin improved the control in nearly all the treatments.

Fink (H. C.). **Streptomycin-fungicide mixtures as Potato seed piece treatments.**—*Plant Dis. Reptr*, **42**, 8, pp. 965–971, 2 fig., 1958.

Field and laboratory tests at Pennsylvania State University showed that potato seed piece rot (*Erwinia atroseptica*) [cf. **36**, p. 785] can be controlled in the laboratory, in the absence of soil, by streptomycin sulphate at 100 p.p.m., and that mixtures of different fungicides and dieldrin with the streptomycin did not have an adverse effect under these conditions. There was, however, no correlation between the results of field and laboratory testing; none of the treatments gave commercial control in the field.

Masurat (G.). **Zum Auftreten der Eisenfleckigkeit der Kartoffel in Deutschland.** [The occurrence of internal rust spot of Potato in Germany.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **12**, 4, pp. 61–72, 3 maps, 2 graphs, 1958. [English and Russian summaries. 100 refs.]

From a critical survey of records at the Pflanzenschutzmeldedienst it is concluded that internal rust spot is most prevalent and severe in Brandenburg, Niedersachsen, and some adjacent areas, where the soil is mostly light and sandy. Weather fluctuations during tuber development aggravate the condition. Growers are advised to use vars. which are tolerant of poor soil (e.g. Frühnudel, Mittelfrühe, Merkur, and Voran), to raise the soil status, and to irrigate or water where this is practicable.

Martin (W. J.). **Distal-end rot of Sweetpotatoes of the Acadian variety.**—*Plant Dis. Reptr*, **42**, 8, p. 983, 1 fig., 1958.

Acadian sweet potatoes, released by the Louisiana Agricultural Experiment Station, Baton Rouge, in 1956, have proved subject to a post-harvest decay of the distal end of the root (incidence up to 30%), the cause of which is uncertain.

Girardeau (J. H.). **The Sweetpotato whitefly, Bemisia inconspicua (Q.), as a vector of Sweetpotato mosaic in South Georgia.**—*Plant Dis. Reptr*, **42**, 6, p. 819, 1958.

At Georgia Coastal Plain Experiment Station, Tifton, *B. inconspicua* transmitted sweet potato mosaic virus [**37**, p. 307] in 5 of 6 tests when caged with infected and virus-free plants.

Egan (B. T.) & Hughes (C. G.). **Top rot can cause losses.**—*Cane Gr. quart. Bull.*, **22**, 1, pp. 35–36, 2 fig., 1958.

In N. Queensland top rot [*Pseudomonas rubrilineans*: cf. **29**, p. 332] of sugarcane appears in 2 forms. Initial symptoms are narrow bright-red stripes on the leaves (red stripe disease), which do little damage, but sometimes penetration of the heart by the bacteria results (top rot). The latter form is usually confined to the tropics; after an abnormally dry spring and early summer, followed by the wet season, it attacks canes which in normal years are little affected. Soil that dries out easily favours the disease, which at present in not serious, because of the high resistance of the popular vars. and autumn rather than spring planting. It appears,

however, that Q. 67 may be much more susceptible than Badila, which is quite susceptible when planted in the spring.

Webster (B. N.). **Reducing the cost of blister blight control.**—*Span*, *1958*, 2, pp. 34–35, 1 fig., 1958.

In recent experiments on the control of blister blight [*Exobasidium vexans*] of tea in Ceylon [**37**, p. 310] simultaneous spraying of 2 or 4 rows of tea was achieved by the use of double-nozzled sprayers. Also, as a result of an observed correlation between hours of sunshine and incidence of blister blight, it was held that 2–3 sunny days/week justified reduction in the Cu applications.

Kashihara (Y.) & Hidaka (Z.). **Effects of Tobacco mosaic disease on the yield and quality of Tobacco.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 139–142, 5 fig., 1957. [Japanese. Abs. from English summary. 14 refs.]

During studies in 1949, 1950, and 1952 at the Hattano Tobacco Experiment Station the losses in tobacco inoculated with tobacco mosaic virus 0, 15, 30, and 45 days after transplanting were: 42, 38, 32, 10% in yield and 61, 62, 37, 15% in quality.

Lucas (G. B.) & Winstead (N. N.). **Control of Tobacco mosaic with an antiviral agent.**—Abs. in *Phytopathology*, **48**, 6, p. 344, 1958.

In greenhouse trials 70% of the tobacco and tomato transplants atomized with 100 and 500 p.p.m. cytovirin [**37**, p. 28] 1 hr. before 1 leaf of each was inoculated with tobacco mosaic virus showed no mosaic after 30 days, whereas all the untreated inoculated plants developed symptoms within 14 days. In the field tobacco transplants sprayed ($\frac{1}{2}$ pint/sq. yd.) with 5, 25, or 50 p.p.m. cytovirin 24 hr. before handling with virus-contaminated hands were compared with unsprayed inoculated and uninoculated plants. After 30 days 14, 0, 6, 60 and 0% of the plants, respectively, showed symptoms, and after 60 days, 50, 20, 56, 100, and 16%.

Weintraub (M.) & Kemp (W. G.). **The effect of darkness on lesion production in Nicotiana glutinosa L.**—*Canad. J. Bot.*, **36**, 4, pp. 455–456, 1958.

At the Plant Pathology Laboratory, St. Catherines, Ontario, *N. glutinosa* plants kept in the dark before and after sap inoculation with tobacco mosaic virus, either with or without abrasion, developed more lesions than those in the light. Rubbing with carborundum and water produced lesions similar to virus lesions, and may give misleading results in virus assays [cf. **36**, p. 355].

Batikyan (R. V.). Бактериальная рябуха Табака в Армянской ССР. [Bacterial spotting of Tobacco in the Armenian S.S.R.]—Изв. биол. сельск. Наук, Акад. Наук Армянск. ССР [*Bull. biol. agric. Sci., Acad. Sci. Armen. S.S.R.*], **9**, 7, pp. 69–80, 1956. [Abs. from *Referat. Zh. Biol.*, *1958*, 7, p. 192, 1958.]

A detailed account of a severe outbreak of *Pseudomonas tabacum* [map 293] on tobacco, causing up to 100% loss in the 1st and 2nd leaf harvests. The bacterial strain isolated proved different in virulence from the American and Bulgarian strains. The pods and stems were not affected.

Sinclair (J. B.) & Brown (R. T.). **Effect of Tobacco mosaic virus upon yields of three Tomato varieties.**—Abs. in *Phytopathology*, **48**, 6, p. 345, 1958.

Tomato vars. were inoculated [at the University of Wisconsin] with tobacco mosaic virus from tomato 8 weeks after planting out in the field, or left uninoculated. The uninoculated plants of Moreton hybrid and Manalusie yielded more than the inoculated; there was no such difference in Grothen's Globe. Moreton hybrid yielded significantly more than the other vars. in both series.

Edginton (L. V.) & Walker (J. C.). **Influence of calcium and boron nutrition on development of Fusarium wilt of Tomato.**—*Phytopathology*, **48**, 6, pp. 324–326, 1958.

A more detailed account is given [cf. **37**, p. 316] of disease ratings made at the University of Wisconsin, Madison; 17–20 days after inoculation there was a decline in severity of wilt symptoms induced by *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* in Bonny Best tomatoes as Ca was increased from 5 to 500 p.p.m. in the nutrient solution. Severe disease occurred with B at both 0·001 and 10 p.p.m. when 5 p.p.m. Ca was supplied, but with 100 p.p.m. Ca the disease index decreased as B supply rose from 0·001 to 0·25 p.p.m.; with 500 p.p.m. Ca it increased consistently as B increased from 0·001 to 10 p.p.m. [cf. **15**, p. 406].

Collins (R. P.) & Scheffer (R. P.). **Respiratory responses and systemic effects in Fusarium-infected Tomato plants.**—*Phytopathology*, **48**, 7, pp. 349–355, 4 graphs, 1958.

Further information is given from Michigan State University, East Lansing [cf. **37**, p. 113] on respiration in leaves of susceptible Bonny Best tomato plants 1 day after root inoculation with *Fusarium oxysporum* f. [*F. bulbigenum* var.] *lycopersici* [cf. above], a slight increase then being followed by another more marked, 8 days later and reaching a peak in the next few days, the timing and degree of stimulation depending on the environment. Stems responded similarly and although total N in later stages was higher in diseased than in healthy plants results were comparable both on a dry weight and on a N-content basis. The pathogen was not present in the leaves, suggesting the occurrence of systemic respiratory toxins, distinct from wilt-inducing agents. Pectinase did not affect leaf respiration. When inoculated cuttings were placed in solutions of ethylene at 1:10 or 1:100 the rate of disease development was increased and a 1:5 solution broke down resistance in var. Jeffersen. Increased conductivity, presumably due to increased cell permeability, occurred in the pathogen-free leaves of infected plants, further supporting the hypothesis of systemic toxemia.

Butler (E. E.), Kimble (K. A.), & Zaiger (D.). **Occurrence of Tomato fruit pox in California.**—*Plant Dis. Reptr*, **42**, 7, pp. 850–851, 1 fig., 1958.

Pox symptoms [cf. **19**, p. 499] were observed on Pearson tomatoes near Patterson, affecting 75% of the plants in some fields. At the University of California, Davis, *Alternaria tenuis* and/or *Stemphylium botryosum* [*Pleospora herbarum*] were isolated from fruit lesions with dark borders, whereas those without a dark border, and the small, green spots yielded no organisms.

Termohlen (G. P.). **Kurkwortel-verschijnselen van Tomaat, veroorzaakt door een steriel mycelium. II.** [Corky root symptoms on Tomato, caused by a sterile mycelium. II.]—*Tijdschr. PlZiekt.*, **63**, 6, pp. 369–374, 3 fig., 1958. [English summary.]

A further account is given of the fungus causing the disease [cf. **37**, p. 250] and proof of its pathogenicity. The corky symptoms appear to be characteristic of heavier soils and brown root of light soils.

Eisenberg (W. V.). **Mold counts of canned Tomatoes.**—*J. Ass. off. agric. Chem., Wash.*, **41**, 2, pp. 360–367, 1 graph, 1958.

This is a comprehensive, tabulated survey of progress to date in U.S.A. in the analysis of canned tomato products for moulds [**25**, p. 425; **37**, p. 643].

Ashour (W. A.) & El-Kadi (M. M.). **Damping-off disease of Tomato seeds and its control.**—*Ann. agric. Sci., Cairo*, **1**, 2, pp. 111–126, 2 fig., 2 graphs, 1956. [Arabic summary.]

The highest percentage germination of tomato seeds was obtained from Mar. sowing,

this decreasing rapidly at higher soil temp. owing to pre-emergence damping-off; post-emergence damping-off increased at moderate temp. *Fusarium semitectum*, *Rhizoctonia* [*Corticium*] *solani*, and *Alternaria tenuis* were isolated from damped-off seedlings, *F. semitectum* mostly from unemerged and *C. solani* from diseased seedlings. Emergence and damping-off were higher in the inoculated than the control soils; they were also increased by the retarded date of watering and the increased density of sowing. Yellow cuprocide at 1·5% retarded the fungi *in vitro* but was only slightly effective in the field.

Newhook (F. J.). **Leaf mould of Tomatoes.**—Reprinted from *N.Z. Comm. Gr.*, **13**, 2, 1 p., 1957.

Control of tomato leaf mould (*Cladosporium fulvum*) [cf. **36**, p. 216] is difficult because the spores can germinate at lower humidities than those required for effective action of most fungicides, and because of the dense foliage of the mature crop. It was noted that resistant vars. became susceptible to certain pathogenic races, of which there are at least 3 in New Zealand, 1 being different from those recorded elsewhere. The response of many imported resistant vars. in New Zealand (tabulated) is often different from their behaviour elsewhere.

Schmelzer (K.). **Wirtspflanzen des Tomatenzwergbusch-Virus (Marmor dodecahedron Holmes).** [Host plants of the Tomato bushy stunt virus (*Marmor dodecahedron* Holmes).]—*Z. PflKrankh.*, **65**, 2, pp. 80–89, 21 fig., 1958. [English summary.]

At the Institut für Phytopathologie, Aschersleben, a strain of tomato bushy stunt virus from Rothamsted was sap inoculated by abrasion to 175 plant spp., of which 52, representing 18 families, proved to be possible hosts [cf. **36**, p. 590]; they are listed, with descriptions of symptoms. Most infections were localized.

MacNeill (B. H.) & Ismen (H.). **A newly differentiated component of the Tomato virus-streak complex.**—*Plant Dis. Reptr*, **42**, 7, p. 898, 1958.

The severity of streak symptoms on greenhouse and field tomatoes in some areas of S. Ontario [**35**, p. 50] may be linked with the occurrence of a new strain, apparently of tobacco mosaic virus, which in combination with potato virus X was far more virulent on tomato than potato virus X+Holmes's type strain of tobacco mosaic virus. The new strain differs from the type in producing local lesions on petunia and failing to become systemic. In tomato sap it was inactivated after 10 min. at 88° C., the dilution end-point was about 10^{-6}, and infectivity was maintained after 25 days at room temp.

Bagchee (K.). **Diseases of forest trees in India—causes, effects and methods of prevention.**—*Indian For.*, **84**, 7, pp. 407–417, 1958.

Much of the information in this résumé of the progress of work in India during the past 5 years has already been noticed [cf. **31**, pp. 409, 410, 411; **32**, p. 158, *et passim*].

Parmasto (E.). **Musta toriko bioloogiast Eesti NSV-s.** [On the biology of *Inonotus obliquus* in the Estonian S.S.R.]—*Eesti Loodus*, **50**, pp. 203–208, 1 fig., 1957. [Abs. from Russian and English summaries.]

A note on abortive sporophores of *I. obliquus* [*Poria obliqua*] found on living birch trunks in Estonia. Fertile sporophores occur on dead but still erect trunks.

Hafstad (G. E.). **Possible long distance spread of Dutch Elm disease by transported beetles.**—*Plant Dis. Reptr*, **42**, 7, pp. 893–894, 1958.

Observations in Wisconsin on elms infected by *Ceratocystis ulmi* [**37**, p. 117] indicate that infested beetles are transported over long distances by road and rail traffic.

De Azevedo (Natalina F. D. S.) & Dos Santos (Aniceta C.). **Botryosphaeria berengeriana de Not. em Eucalyptus globulus Labill.** [*Botryosphaeria berengeriana* de Not. on *Eucalyptus globulus* Labill.]—*Agron. lusit.*, **17**, pp. 191–201, 1 pl., 1955. [French summary. Received 1958.]

In the Rio Maior region, Portugal, in 1953–4, a wilt of *E. globulus* occurred. The pathogen was identified as *B. berengeriana* [cf. **35**, p. 236], which was found in necrotic areas, accompanied by *Dothiorella berengeriana* and *D. vulgaris*; only *Dothiorella* was obtained in culture.

Creelman (D. W.). **The control of spot anthracnose of Linden.**—*Plant Dis. Reptr.*, **42**, 7, pp. 895–896, 1958.

At Lunenburg, Nova Scotia, *Elsinoe tiliae* on lime trees (*Tilia europaea* and *T. platyphyllos*) [**36**, p. 217] was controlled by 2 sprays of captan early in the summer, the 1st as the leaves were unfolding. At Bridgetown 2 applications of 10:5:100 Bordeaux in June were also effective but failed to control *Cercospora microspora*.

Johnson (T. W.), Goforth (M. H.), Powell (R. W.), & Haar (N. D.). **Observations on Yellow-Poplar dieback.**—*For. Sci.*, **3**, 1, pp. 84–89, 1957.

In a 2-year study at the Dept of Botany and School of Forestry, Duke University, N. Carolina, on dieback of *Liriodendron tulipifera* [cf. **34**, p. 410] in Duke Forest, 3 sporulating fungi (*Pestalotia* sp., ? *Myxosporium* sp., and *Cladosporium cladosporioides*), several non-sporulating fungi, and a *Xanthomonas* sp. were consistently isolated from cankers.

Inoculations in the field at breast height with the *Myxosporium* isolate of Toole and Huckenpahler [loc. cit.] and 3 isolates (YPD 1, 2, and 19) similar to it from the cankered trees induced cankers at the inoculation site of all 17 trees tested after intervals of 89–238 days; in 13 of the 16 surviving trees other cankers developed subsequently. However, only 1 tree (inoculated with YPD 1) developed dieback symptoms. The disease affects trees in somewhat isolated groups and varies in its severity: sometimes single isolated cankers occur only on the weaker understory saplings, while at other times there is high mortality in stands of vigorous trees up to 6 in. d.b.h. Severity is greater on upland sites, particularly in mixed stands of pine and yellow poplar.

Anderson (G. W.) & Anderson (R. L.). **The long-distance spread of Oak wilt, 1955 to 1957.**—*Tech. Note Lake St. For. Exp. Sta.* 520, 1 p., 1958. [*For. Abstr.*, **19**, 3, p. 389, 1958.]

Strip surveys in Minnesota and Wisconsin over a period of 3 years indicated a constant rate of spread of oak wilt [*Ceratocystis fagacearum*: **37**, p. 683], 1 new infection centre becoming established annually for every 15 miles or 60 acres sampled.

Drake (C. R.), Kuntz (J. E.), & Riker (A. J.). **Tree wounds and long-distance spread of Oak wilt.**—*For. Res. Note Wis. Coll. Agric.* 39, 3 pp., 1957. [*For. Abstr.*, **19**, 3, p. 389, 1958.]

Experimental data showed that oaks wounded during the critical spring period are subject to infection [by *Ceratocystis fagacearum*: see above and below], but that it is possible to reduce or prevent such infections by wound dressings.

Phelps (W. R.), Kuntz (J. E.), & Riker (A. J.). **Antibiotics delay Oak wilt symptoms on inoculated Northern Pin Oaks in Central Wisconsin.**—*For. Res. Note Wis. Coll. Agric.* 31, 2 pp., 1957. [*For Abstr.*, **19**, 3, p. 389, 1958.]

Quercus ellipsoidalis trees artificially inoculated with *Endoconidiophora* [*Ceratocystis*] *fagacearum* [see above] were injected with antibiotics antagonistic to cultures

of the fungus. Oligomycin and actidione and its acetate derivative appeared to retard the development of the disease, but in no instance cured it.

Drake (C. R.), Kuntz (J. E.), & Riker (A. J.). **Chemical control of the Oak wilt.**—*For. Res. Note Wis. Coll. Agric.* 35, 2 pp., 1957. [*For. Abstr.*, **19**, 3, p. 389, 1958.]

Treatment of oak trees infected by wilt [*Ceratocystis fagacearum*] with 2,4-D, 2,4,5-T, and ammate to prevent spread through roots gave top kill, but only limited root kill. Watering a 3 ft. band of soil 10 ft. from the infected trees was satisfactory but slow in results. Soil injections with methyl bromide killed the roots and prevented spread.

Ivanchenko (Y. N.). О причине усыхания Дуба насаждений Липецкой дачи Савальского лесничества. [The causes of Oak wilt in the Lipetsky garden in the Saval'sky Forest.]—*Trud. vsesoyuz. Inst. Zashch. Rast.*, *1957*, 8, pp. 221–225, 1957.

An intensive wilt of oak was 1st noticed in the Saval'sky Forest, U.S.S.R., in 1953 and by 1955 25% of the trees were dead. *Ophiostoma roboris*, *O. valachicum*, *O. kubanikum*, and *Fusarium* sp. were isolated from wilted trees. Their pathogenicity was established by inoculation separately into healthy trees, each strain being recovered after 8 days from the superficial lesions formed. Typical wilt occurred only in trees inoculated with all 4 fungi. Isolation of the fungal complex from parts damaged by the oak bark beetle (*Scolytus intricatus*) indicated that it is a carrier.

Potlaychuk (V. I.). К биологии возбудителя, вызывающего усыхание Дуба. [On the biology of the causal agent of Oak wilt.]—*Trud. vsesoyuz. Inst. Zashch. Rast.*, *1957*, 8, pp. 227–237, 1 fig., 1957.

In investigations begun in 1954 a relationship was established between the complex of fungi causing oak wilt in the Black Sea region and Moldavia, U.S.S.R. (*Ophiostoma* and *Ceratostomella* spp.) [cf. above] and similar spp. attacking elm. Isolates from the 2 hosts were pathogenic on cross-inoculation and such transmission is very common in nature. Infection is carried in acorns [cf. **37**, p. 423].

Böhm (A.). **Dothichiza populea Sacc. et Br. kao uzročnik propadanja Topola s posebnim obzirom na jaku zavazu u proljeće 1956 u Hrvatskoj.** [*Dothichiza populea* Sacc. & Br. as a cause of Poplar mortality, with special reference to the outbreak in Croatia during the spring of 1956.]—*Šum. List.*, **81**, 1–2, pp. 13–30, 1957. [*For. Abstr.*, **19**, 3, p. 390, 1958.]

In the 1956 epidemic in poplar plantations in Croatia caused by *D. populea* [**37**, p. 604] the only unaffected sp. was *Populus candicans*.

Good (H. M.) & Spanis (W.). **Some factors affecting the germination of spores of Fomes igniarius var. populinus (Neuman) Campbell, and the significance of these factors in infection.**—*Canad. J. Bot.*, **36**, 3, pp. 421–437, 6 graphs, 1958.

In these studies at Queen's University, Kingston, Ontario, the germinability of basidiospores of *F. i.* var. *populinus* [cf. **32**, p. 348] from different sporophores on poplar was found to vary considerably, but the time of day when they were collected had little effect, and seasonal variation (as tested on 1 fructification) was slight, with a minimum germinability in late summer. Germination was best on 8% malt extract at pH 4, being stimulated partly by the sugar content and partly by an unknown factor. Only a trace occurred on water agar and none on alkaline media. Extracts of surface wood from aged wounds (pH 4·6) were more favourable to germination than those from fresh sapwood (6–6·3) even though the latter contained more sugars and amino acids. Though pH appears to be an important factor there was still a difference when the 2 extracts were buffered to the same level.

Spores germinated well at 20–35° C., but poorly below 15°. They may remain viable for over 2 months, but viability is extremely variable, some being very short-lived. Since the spores need 30–40 hr. to germinate, germination must occur on wound surfaces already partly colonized by faster growing saprophytes, which probably reduce the pH.

Basham (J. T.). **Decay of Trembling Aspen.**—*Canad. J. Bot.*, **36**, 4, pp. 491–505, 2 pl., 1958.

Of 1,754 aspen trees (*Populus tremuloides*) examined from 47 even-aged stands in N. Ontario, 1,212 were decayed in the merchantable portions of the trunk. The types of heart rot [**37**, p. 116] encountered were: a white spongy trunk or butt rot (*Fomes igniarius* var. *populinus*) [see above], a yellow stringy trunk rot (*Radulum casearium*), and stringy butt rots from which *Pholiota spectabilis* and *Armillaria mellea* were most often isolated. Brown and red mottled stains were associated with *Corticium polygonium*, *Libertella* sp., and *Phialophora alba*, which were also isolated from incipient decays. Incidence and volume of decay increased with age of stand and susceptibility was somewhat higher under dry soil conditions. The sequence of invaders—fungi imperfecti colonising and staining the wood followed by basidiomycetes causing decay—is attributed to successive changes in the properties of the wood.

Van den Ende (G.). **Het onderzoek over de populierenkanker veroorzaakt door Pseudomonas syringae v. Hall f. sp. populea Sabet.** [Investigation of Poplar canker caused by *Pseudomonas syringae* v. Hall f. sp. *populea* Sabet.]—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 527–533, 1 pl., 1957. [English summary.]

This is a brief survey from the Willie Commelin Scholten Phytopathological Laboratory, Baarn, Holland, of research on poplar canker since 1935. It is suggested that the time of assessment of the results of inoculation with *P. s.* f. sp. *populea* [**36**, p. 794] is very important for obtaining reliable figures. Some poplars, e.g. *Populus brabantica*, developed cankers increasing in size during the years following inoculation, others, e.g. *P. serotina*, had symptoms only in the 1st year. Some parents, e.g. *P. nigra* and *P. nigra italica*, always produce a high number of resistant seedlings.

Volger (C.). **Probleme der Bekämpfung von pilzparasitären Keimlingskrankheiten bei Nadelbäumen.** [Problems in the control of parasitic fungal seedling diseases of conifers.]—*Meded. LandbHogesch. Gent.*, **22**, 3, pp. 517–525, 1957. [English summary.]

Of 15 preparations tested at Göttingen University, Germany, only thiram (in the form of tripomol) seed dressing effectively protected pine seedlings raised in soil from a seed bed infected with spp. of *Rhizoctonia*, *Fusarium*, and *Botrytis* and inoculated with *Pythium debaryanum*. It appeared to have a systemic action.

Bakshi (B. K.), Singh (B.), & Puri (Y. N.). **Occurrence of Polyporus leucospongia in India.**—*Canad. J. Bot.*, **36**, 3, pp. 363–365, 1 pl., 1 fig., 1958.

The authors describe this fungus, hitherto known only from N. America [cf. **33**, p. 565]; it is now found commonly in the western Himalayas above 6,000 ft. on logs and stumps of conifers.

Yokota (S.). **Observations on the butt rot of Sakhalin Fir (Abies sachalinensis Mast.) in the Tokyo University Forest, Hokkaido, with special reference to infection and propagation of decay.**—*Bull. Tokyo Univ. For.* 52, pp. 165–171, 7 fig., 1956. [*For. Abstr.*, **19**, 3, p. 387, 1958.]

Decay was seldom due to only 1 pathogen, and more than 2 were usually involved, chiefly *Fomes annosus* [see below], *Polyporus balsameus*, and *P. schweinitzii*.

Sasaki (T.) & Yokota (S.). **Wood decay of Abies sachalinensis forest in Tokyo University Forest in Hokkaido. II.**—*Bull. Tokyo Univ. For.* 52, pp. 75–87, 1956. [Japanese. *For. Abstr.*, **19**, 3, p. 387, 1958.]

In trees over 10 cm. d.b.h. *Fomes annosus* [see above] caused over 60% of the total vol. of decay and *Polyporus schweinitzii* 13%. Shortening the rotation is suggested as the best means of reducing losses from butt and root rot.

Yokota (S.). **Wood decay of Abies sachalinensis in the Tokyo University Forest, Hokkaido. III. On wood decay of Oni-todo.**—*Bull. Tokyo Univ. For.* 53, pp. 139–148, 2 fig., 1957. [Japanese with English summary. *For. Abstr.*, **19**, 3, p. 388, 1958.]

'Oni-todo' is the name given to individuals of *A. sachalinensis* which have cracks or protuberances on the bark (*A. sachalinensis* var. *corticosa*). These trees often have a thick bark and branches and crooked stems. An examination of 200 of these trees revealed a high percentage of butt and root rot [chiefly due to *Fomes annosus*, *Polyporus balsameus*, and *P. schweinitzii*: see above], a tendency to wind-throw, and poor increment. They should be felled as soon as possible.

Iizuka (N.). **Study on the judgment method of inner rot of the living tree (Todo-Fir) by γ-ray.**—*Bull. Tokyo Univ. For.* 52, pp. 143–163, 1956. [Japanese with English summary. *For. Abstr.*, **19**, 3, p. 387, 1958.]

The author devised an apparatus using the radio-active isotope Co^{60} and a portable counter to detect the existence and estimate the extent of [unspecified] heart rot in *Abies mayriana*. The results differed with the temp. prevailing when the observation was made. Success in identifying sound trees at temps. above and below 0° C. was 100% and 80%, respectively, and in identifying decayed ones 93% and 75%, respectively [cf. **37**, p. 116].

Sato (K.), Ota (N.), & Shoji (T.). **Control of snow mould on Cryptomeria transplants.**—*J. Jap. For. Soc.*, **39**, 10, pp. 406–409, 1957. [Japanese. *For. Abstr.*, **19**, 3, p. 386, 1958.]

In Sept. transplantings there was 17% mortality from *Fusarium* sp. and *Pestalotia shiraiana* [cf. **33**, p. 327] before snowfall, but no mould subsequently. Later transplanting resulted in no mortality, but the percentage of mould was 0·9 in Oct., 24·2 in Nov., and 3·1 in. Dec. The longer the snow lay and the worse the soil drainage the greater the severity of infection. A *Rhizoctonia* was the most active mould, then *Sclerotinia kitajimana* [cf. **36**, p. 439]; *Botrytis cinerea* [loc. cit.] was the least active. In group plantings there was 51·5% infection, in spaced single seedlings 22·5%, and in seedlings not transplanted 0·4%.

Rack (K.). **Erfahrungen mit Fungiziden zur Bekämpfung der Kiefernschütte.** [Experiences with fungicides in the control of Pine needle cast.]—*NachrBl. dtsch. PflSchDienst (Braunschweig), Stuttgart*, **10**, 4, pp. 54–58, 2 graphs, 1958. [English summary.]

Trials made since 1953 by the Niedersächsische Forstliche Versuchsanstalt in a search for a suitable treatment of pine against *Lophodermium pinastri* [**37**, p. 425] have demonstrated the marked superiority of zineb preparations over 40 other fungicides [cf. below]. One spraying reduced the infection by 64%, a result not achieved by 2 applications of most of the other fungicides. In all tests since 1954 sprays have been applied at the time of spore release [**36**, p. 715].

Schönhar (S.). **Erfahrungsberichte aus der Forstlichen Versuchsanstalt, Stuttgart. Nr. 5. Spritzversuche gegen die Forchenschütte mit verschiedenen Fungiziden.** [Reports from the Stuttgart Forest Research Institute. No. 5. Spraying tests

with various fungicides against needle cast.]—*Allg. Forstzeitschr.*, **11**, 43, pp. 556–557, 1956. [*For. Abstr.*, **19**, 3, p. 390, 1958.]

Of 6 different fungicides used experimentally against *Lophodermium pinastri*, dithane gave the best results [cf. above]. Cupravit gave better protection when used with a wetting agent than without.

Taconis (P. J.). **Ziekten en plagen van Kerstsparren.** [Diseases and pests of Christmas Spruces.]—*Ned. BosbTijdschr.* (formerly *BoschbTijdschr.*), **29**, 12, pp. 289–292, 1957.

The pre-emergence phase of damping-off is associated in the Netherlands with infection by soil fungi, e.g., *Corticium*, *Fusarium*, *Pythium*, and *Coniothyrium* spp., but the late stage of collapse, developing in Sept., has lately been shown to be due to nematodes. The Christmas spruce is highly susceptible to invasion by rhizomorphs of *Armillaria mellea* on sites from which beeches have been removed, leaving infected stumps and roots. Therefore, potatoes and rye should each be grown for a year before replanting such areas; lupins promote more rapid growth in poor soils.

Wagener (W. W.). **Infection tests with two rusts of Jeffrey Pine.**—*Plant Dis. Reptr*, **42**, 7, pp. 888–892, 2 fig., 1958.

In tests at the University of California, Berkeley, following failure to obtain field evidence of the existence of alternate hosts of the *Peridermium* sp. causing crown damage to *Pinus jeffreyi* in the Inyo National Forest, *Castilleja miniata* [cf. **36**, p. 436] with a low level of natural contamination developed much heavier infection when inoculated with aecidiospores of *Peridermium* [*Cronartium*] *stalactiforme* from *Pinus jeffreyi* or *P. contorta*, whereas the Inyo *Peridermium* gave negative results. It is suggested that the Inyo rust may be an evolutionary offshoot of *Cronartium coleosporioides* f. *filamentosum* [*C. filamentosum*] in which heteroecism has been reduced to autoecism. It also infects scattered Jeffrey pine in other parts of California. *C. stalactiforme* occurs sparingly on young Jeffrey pine and very commonly on *Pinus contorta* in the Inyo region.

Peace (T. R.). **The raising of Thuja in isolated nurseries to avoid infection by Keithia thujina.**—*Scot. For.*, **12**, 1, pp. 7–10, 1958. [*For. Abstr.*, **19**, 3, pp. 386–387, 1958.]

In the experiment started in 1948, in which attempts are in progress to produce clean stocks of *Thuja* spp. from seed in 11 isolated nurseries [**35**, p. 644], 2 are still free from *K. thujina* after 9 and 7 years, respectively, 2 became infected by diseased *T.* sp. 500–1,000 yd. away, 2 by imported stock, and 5 from unknown sources.

Příhoda (A.). **Hniloby stromů, poškozených přibližováním dřeva.** [Fungal decay in trees damaged during skidding.]—*Lesn. Práce*, **36**, 6, pp. 271–273, 1957. [*For. Abstr.*, **19**, 3, p. 388, 1958.]

Polyporus stipticus accounted for about 90% of the butt rot in damaged tree-length spruce logs in the school forest at Kostelec, Czechoslovakia. *P. fragilis* appeared in moist localities with permanent shade, and *Lenzites saepiaria* attacked roots in dry places. *P. borealis* often occurs in the mountains on roots of damaged conifer stems. *Stereum hirsutum* and *S. rugosum* were present on damaged logs of oak, beech, and birch.

Batista (A. C.). **Lesões foliares do Cajueiro causadas por Phomatospora anacardicola n.sp.** [Foliage lesions on Cashew nut caused by *Phomatospora anacardicola* sp. nov.]—*An. Soc. Biol. Pernambuco*, **15**, 2, pp. 255–260, 4 fig., 1957. [English summary.]

A disease resulting in irregular brown ferruginous spots on leaves of *Anacardium*

occidentale, caused by *P. anacardicola* Batista, is reported from the University of Recife, Brazil. The asci are 35–50×15–17 μ, the hyaline ascospores 12·5–16× 5–6 μ, and the pycnidiospores 7–11×6–7 μ.

New vegetable varieties. List V.—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 591–600, 1958.

This list [cf. **36**, p. 153] includes the bean [*Phaseolus vulgaris*] vars. Medal Refugee, Stringless Blue Lake No. 231, Potomac, Rialto, Ranger, Tenderlong, Tenderbest, Stringless Blue Lake Clara Val., Stringless Blue Lake F-M 1, Topmost, Small White 51, Small White 52, White Seeded Contender, Choctaw, and Florigreen, all resistant to common bean mosaic virus, some also to strain N.Y. 15, and some to rust [*Uromyces appendiculatus*], [powdery] mildew [*Erysiphe polygoni*], or bean southern mosaic virus. The celery var. Slow Bolting Green No. 12 is resistant to yellows [*Fusarium apii*], cucumber Ohio MR-200 to [cucumber] mosaic [virus], and muskmelon Dessert Sun to powdery mildew [*Erysiphe cichoracearum*]; the pea vars. Glacier, Surpass, Lolo, Wyola, Hardy, Resistant Early Perfection 326, Rainier, Early Sweet 11, Apex, Laxton 7, and Jade are resistant to *Fusarium* wilt [*F. oxysporum* f. *pisi*], and Pacific Freezer to *Fusarium* root rot [*F.* spp.]; pepper vars. Thick Walled World Beater and Merced B resistant to tobacco mosaic [virus]; the potato var. Merrimack (B 355–44) highly resistant to late blight [*Phytophthora infestans*] and ring rot [*Corynebacterium sepedonicum*], and Delus (B 73–18) resistant to late blight; sweet potato Coppergold resistant to stem rot [*F. bulbigenum* var. *batatis*]; and the tomato vars. J. Moran, Grathens Globe (W.R.), Wiltmaster, and Pinkshipper resistant to *Fusarium* wilt [*F. bulbigenum* var. *lycopersici*], while Grand Pak is resistant to *Verticillium* [*albo-atrum*].

Colhoun (J.). **Club root disease of Crucifers caused by Plasmodiophora brassicae Woron.**—*Phytopath. Pap. Commonw. Mycol. Inst.* 3, vi+108 pp., 4 pl., 1 map, 1958. 20*s*. [389 refs.]

In this valuable monograph brief preliminary chapters on economic significance, early history, geographical distribution, common names, and symptoms are followed by condensed, comprehensive surveys of present knowledge concerning the life history, environmental factors in relation to infection, reaction of the host to infection, spore survival and dissemination, host range, varietal reaction of cultivated hosts to infection, physiologic specialization of the parasite, the nature of host resistance, control of the disease, and methods for the evaluation of soil treatments [cf. **34**, p. 422].

Shimizu (S.), Kanazawa (K.), & Kobayashi (T.). **Studies on the breeding of Chinese Cabbage for resistance to soft rot. Part 1. Difference of resistance among varieties under field conditions.**—*Bull. nat. Inst. agric. Sci., Kanagawa*, Ser. E, 6, pp. 75–108, 16 fig., 15 graphs, 1958. [Japanese. Abs. from English summary.]

During 1952–55 82 vars. of chinese cabbage were evaluated for field resistance to soft rot (*Erwinia aroideae* and *E. carotovora* [cf. **37**, p. 60]) according to the degree of damage suffered. This was most severe from the end of Oct. and in Nov. in the Aug. sown crop (appearing 40–45 days after sowing), and from the end of June to the middle of July in the Apr. crop (lesions after 45–60 days).

When the temp. in Aug. was lowered to 22° C. the outbreak occurred earlier and was more severe. In autumn decay took place below 16° following the appearance of lesions in 10 days (at an av. temp. of 16–22°), but in spring 17–24° was opt. for the disease, which at that season showed rapid linear development.

Of 65 vars. tested in autumn 4 were resistant, 6 slightly, and 14 medium resistant, 29 susceptible, and 12 highly so: in the spring they followed a similar pattern;

resistance was to some extent correlated with ecotype. Susceptible vars. sown in the middle of Aug. were always more damaged than those sown at the end.

HULL (R.). **Spraying Sugar Beet to control virus yellows disease.**—*Brit. Sug. Beet Rev.*, **26**, 3, p. 112, 1958.

A single spray of metasystox in 1957 when there was an average of 1 aphid [*Myzus persicae*]/beet plant checked beet yellows virus [cf. **37**, p. 385] and increased root yield by 23% and the sugar content by 14–14·6%. In years when aphids are prevalent a 2nd spray also gives an economic yield response.

BLAESEN (P.) & THIELEMANN (ROSE). **Zur Frage der Bekämpfung der Vergilbungskrankheit der Beta-Rüben durch Uberträgerbekämpfung mit chemischen Mitteln. II. Die Wirkung verschiedener Wirkstoffgruppen auf die Blattlauspopulation der Beta-Rüben.** [On the control of Beet yellows disease by control of the vector with chemical preparations. II. The effect of various active groups on the aphid population on Beet.]—*Z. PflKrankh.*, **65**, 3, pp. 129–143, 1 diag., 5 graphs, 1958. [English summary.]

In trials against aphids (*Myzodes* [*Myzus*] *persicae* and *Doralis* [*Aphis*] *fabae*) on sugar beet in Nordrhein-Westfalen, Germany, in 1953–56, the systemic insecticides systox [cf. **36**, p. 78] and metasystox were the best, while of the organic P compounds, parathion and chlorthion were markedly better than malathion and diazinon. Winged aphids were little affected by spraying.

BURGHARDT (H.) & BRANDES (J.). **Elektronenmikroskopische und serologische Untersuchungen über das Vergilbungsvirus der Beta-Rüben.** [Electron-microscopic and serological studies on Beet yellows virus.]—*Naturwissenschaften*, **44**, 8, pp. 266–267, 1 fig., 1957.

At the Institut für Virusserologie and the Institut für Landwirtschaftliche Virusforschung, Brunswick, Germany, a comparative study was made of sugar beet yellows, sugar beet yellows necrotic strain (severe etching) [**33**, p. 585], Romagna yellows [**35**, p. 410], and Bercks & Zimmer's strain [**35**, p. 501], all of which formed particles of normal length (1,250 mμ) and gave identical serological reactions. On the other hand, no relationship could be established, either by serological or electron-microscope methods, between the above-mentioned isolates and yellow net [see below], yellow net mild strain, or 41 yellows [**33**, p. 460].

SCHMIDT (H.). **Gelbnetzsymptome durch das Vergilbungsvirus der Rübe.** [Yellow net symptoms caused by Beet yellows virus.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **12**, 4, pp. 77–79, 4 fig., 1958. [English and Russian summaries.]

On transmission by aphids (*Myzus persicae*) to indicator beet plants (var. Kleinwanzleben N) in the greenhouse at the Biologische Zentralanstalt der Deutschen Akademie der Landwirtschaftswissenschaften, Berlin, virus isolates from field beet plants with marked vein clearing (net) symptoms were found to be identical (confirmed serologically) with isolates from field plants with normal yellows symptoms and distinct from the typical beet yellow net virus [**28**, pp. 105, 433, and above].

WENZL (H.) & KREXNER (R.). **Über Hohlraumbildung in Beta-Wurzeln.** [On cavity formation in Beet roots.]—*PflSchBer.*, **20**, 11–12, pp. 179–197, 4 fig., 1 graph, 1958. [English summary.]

After discussing the possible causes of cavity formation in beet roots [cf. **37**, p. 431] the authors conclude that in Austria most cavities in the upper part of the root are of endogenous origin. There is a correlation between the occurrence of such cavities and the formation of secondary leaf tufts, but these phenomena do occur independently. The condition is more common on sandy soil than on heavy loam.

Wenzl (H.). **Der Sämlingtest zum Nachweis von Rübensaatgutinfektionen durch Cercospora beticola Sacc.** [The seedling test for the demonstration of infection in Beet seed by *Cercospora beticola* Sacc.]—*Z. PflKrankh.*, **65**, 2, pp. 67–80, 4 fig., 1958. [English summary.]

In this test used at the Bundesanstalt für Pflanzenschutz, Vienna, 10 g. samples of seed are placed among healthy beet seedlings at the 2-leaf stage, growing thickly in a 16 cm. pot and enclosed in a glass cylinder with a lid; under such damp conditions infection, if present, spreads rapidly to the seedlings, producing characteristic lesions in 2–3 weeks. This method is better than the usual procedure of sowing the samples and examining the seedlings; it revealed infection in some samples where Schmidt's method [**17**, p. 784] failed.

Hagedorn (D. J.). **Some observations on diseases of Pisum sativum in several European countries in 1957.**—*Tijdschr. PlZiekt.*, **64**, 3, pp. 263–268, 1958. [Dutch summary.]

The diseases and their observed occurrence in 5 countries in July are tabulated. In the Netherlands top yellows [pea leaf roll virus: cf. **35**, p. 144] was the most important and often associated with foot or root rot (*Fusarium* spp.); pea streak (several agents, including Wisconsin pea streak virus [**35**, p. 63] and sweet clover virus [**36**, p. 532]) and enation mosaic viruses were widespread, and [Wisconsin pea] stunt disease, caused by red clover vein mosaic virus [cf. **36**, p. 34], was found in 1 field, and the virus was also detected in red clover. From limited observations in England, enation mosaic appeared to be the most important virus disease [**30**, p. 355], though streak was much in evidence. Wilt [*Fusarium oxysporum* f. *pisi*: cf. **37**, p. 126] was seen in 2 fields, being very severe in one, and stunt and pea leaf roll [**36**, p. 812] were also observed.

Enation mosaic, mosaic, streak, stunt, and water congestion [cf. *Phytopathology*, **47**, p. 14, 1957] are reported for the 1st time from Sweden, where pea diseases were observed to be important and water congestion the most widespread. Enation mosaic, mosaic, streak, stunt, pea leafroll, and water congestion are recorded for the 1st time in Switzerland, where streak, widespread but of low incidence, was perhaps the most important. In West Germany, where streak [see below] was likewise the most important disease seen, *Fusarium* root rot (*F. solani* var. [f.] *pisi*) [cf. **30**, p. 501] was also found, with other diseases.

Quantz (L.). **Ein Beitrag zur Kenntnis der Erbsenvirosen in Deutschland.** [A contribution to the knowledge of Pea viroses in Germany.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **10**, 5, pp. 65–70, 9 fig., 1958. [English summary.]

In an investigation at the Institut für Landwirtschaftliche Virusforschung, Brunswick, into a disease complex of peas exhibiting stunt, wilting, and streak symptoms [see above], cucumber mosaic virus was isolated together with a virus, new to Germany, for which the name 'pea stunt virus' is proposed. This virus, which was also isolated from red clover in the field, was sap-transmitted to a number of pea vars. by carborundum abrasion. Some expressed no clear symptoms but infection was demonstrable by inoculation of var. Unica as well as by electron microscopy. In inoculated Unica plants inhibition of growth occurs together with crinkling of the upper leaves. The leaflets of the 1st 2 leaves to show symptoms curl slowly downwards, while the next leaf unfolds only partially, remains small, and bends backwards in claw-like fashion. The veins of this leaf exhibit slight clearing, and on the underside are depressed and free from wax. Later leaves develop more or less normally. A similar symptom pattern is seen in Jewel, Perfected Wales, and Resistant Early Perfection. On Peragis Beisaat violet-brown streak necrosis, yellows, and tip wilt occur. In Foli infection is latent. In late autumn and winter

vars. such as Unica do not develop the symptoms described, but make poor growth and wilt after 2–3 weeks. In *Vicia narbonensis* local necrotic lesions are accompanied by systemic necrotic streaking of the stem tips and the veins of young leaves, and often by top wilt. Side shoots from the base are deformed, flecked with necrotic spots, and sometimes wilted. The thermal inactivation point of the virus lies between 60 and 65° C, its dilution end point is $1:10^5$–$1:10^6$, and longevity 24–48 hr. *in vitro* at room temp.

Beet mosaic virus was isolated in autumn 1956 from peas [cf. **29**, p. 131] exhibiting streak and wilt symptoms in the Brunswick district, this being the 1st recorded occurrence on this host in nature. In 1 plant [var. unspecified], for which symptoms are described in some detail, there was intense brown flecking of the foliage with discoloration of the veins. The youngest leaves were crinkled, had scattered brown markings, and were slow to unfold, while the stunted stems and petioles bore violet to greyish-brown flecks or streaks. In the later stages of the disease yellowing and wilting of the leaves was the dominant feature. Vascular discoloration and wilting were occasionally confined to sectors of the leaves. Young pods dried to a dirty brown colour.

Petersen (H.-J.). **Beiträge zur Genetik der Reaktion von Phaseolus vulgaris L. auf Infektion mit Phaseolus-Virus 1 Stamm Voldagsen.** [Contributions to the genetics of reaction of *Phaseolus vulgaris* L. to infection by *Phaseolus*-virus 1 Voldagsen strain.]—*Z. Pflanzenz.*, **39**, 2, pp. 187–224, 15 fig., 1958. [36 refs.]

At the Max-Planck Institut für Züchtungsforschung, Köln-Vogelsang, Germany, the F_1, F_2, and part of the F_3 from crosses between the susceptible vars. Bagnolais and Saxa Stringless, the hypersensitive Top crop, and the extremely resistant Great Northern U.I.15 (i type resistance) [**29**, p. 487] were examined for reaction to bean mosaic virus [**37**, p. 617] inoculated by abrasion or grafting. There was no difference between the 2 methods in the quality of the reaction. The various crosses showed no reciprocal differences. The author has modified Ali's symbols [loc. cit.] by the addition of 'v' to indicate reaction to the Voldagsen strain. The dominant, independent genes Av and Sv are responsible for susceptibility. In the presence of Av the dominant Iv gene produces hypersensitivity. Extreme resistance is governed by the recessive genes av and sv in conjunction with Iv, or iviv. The gene types of the vars. used are as follows: Bagnolais AvAvsvsviviv (susceptible), Saxa Stringless AvAvSvSviviv (susceptible), Top crop AvAvsvsvIvIv (hypersensitive), and Great Northern U.I.15 avavsvsviviv (resistant).

Cardona-Alvarez (C.) & Skiles (R. L.). **Floury leaf spot (mancha harinosa) of Bean in Colombia.**—*Plant Dis. Reptr*, **42**, 6, pp. 778–780, 2 fig., 1958.

A disease of dry beans (*Phaseolus vulgaris*) caused by *Ramularia phaseolina* [cf. **33**, p. 386], observed at the Colombian Ministry of Agriculture Experiment Station, near Medellin, in 1953, has since become more prevalent and severe in commercial as well as experimental plantings. The name floury leaf spot is derived from the white, tufty growth of conidiophores on the lower surface of the leaves. Infection, confined to the leaves, progresses upwards from the base of the plant and where severe causes defoliation.

Winfree (J. P.), Cox (R. S.), & Harrison (D. S.). **Influence of bacterial soft rot, depth of water table, source of nitrogen, and soil fumigation on production of Lettuce in the Everglades.**—*Phytopathology*, **48**, 6, pp. 311–316, 2 fig., 7 graphs, 1958.

The control of soft rot of lettuce due to *Erwinia* sp. [**35**, p. 264] and possibly *Pseudomonas* sp. was studied at the Everglades Experiment Station, Florida, in 1955–57. The disease begins as a vascular discoloration of the stem, extending to the leaves

and later causing a general breakdown of the butt ('jelly butt') and 'slime head'. Streptomycin gave some control in the field, but at effective strengths (100–200 p.p.m.) tended to be phytotoxic. Tribasic copper sulphate+agrimycin-100, applied throughout the season, reduced diseased heads from 96 (untreated) to 64%.

Experiments on plots at different levels indicated that with higher water tables growth was impaired, soft rot increased, soil acidity decreased, and mineralization of soil N was less rapid. Soil fumigation with chloropicrin gave no control, but influenced ammonification and nitrification in the soil, increasing ammonium N at the expense of nitrate N initially, this position being reversed in 40–70 days (depending on the depth of the water table); possibly the soil microbial population is changed in favour of the pathogen.

GATHERCOLE (J. A.). **The control of Botrytis cinerea on Lettuce by the use of griseofulvin.**—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 573–579, 6 fig., 1957.

The contents of this paper from The Murphy Chemical Co. Ltd., Wheathampstead, Herts., have already been noticed [**37**, p. 621].

SCHNATHORST (W. C.). **An efficient method of obtaining single conidial isolates of powdery mildew.**—*Phytopathology*, **48**, 7, p. 390, 1958.

At the University of California, Davis, conidia of *Erysiphe cichoracearum* dusted on water agar were transferred individually in the water film on the tip of a glass needle to distilled water droplets on detached leaves of lettuce, floated on distilled water in a Petri dish and incubated at 22° C. with an illumination of 300 ft.-c. From 175 single conidial inoculations 26 colonies of the fungus were obtained [cf. **37**, p. 129].

LEE (P. E.) & ROBINSON (A. G.). **Studies on the six-spotted leafhopper, Macrosteles fascifrons (Stål.), and Aster yellows in Manitoba.**—*Canad. J. Pl. Sci.*, **38**, 3, pp. 320–327, 5 fig., 2 graphs, 1958.

Tests at the University of Manitoba, Winnipeg, showed that lettuce was preferred to aster, parsley, carrot, or flax by *M. fascifrons*, the vector of aster yellows virus [cf. **37**, p. 197]. None of the 8 lettuce vars. tested proved resistant, but they showed varying degrees of tolerance, the most tolerant being Trianon Cos. Transmission tests with celery and zinnia indicated the western or Californian strain of the virus [loc. cit.] to be present in Manitoba.

LEYENDECKER (P. J.). **Big vein of Lettuce discovered in New Mexico.**—*Plant Dis. Reptr*, **42**, 8, p. 989, 1958.

In 1958 this disease [cf. **37**, p. 621] was found in the Mesilla Valley, sometimes causing losses up to 65–70%. It is more prevalent in heavy soil or where irrigation water has stood for some time.

HAEGERMARK (U.). **Sclerotium cepivorum Berk., en svampsjukdom på Lök.** [*Sclerotium cepivorum* Berk., a fungus disease of Onion.]—*Växtskyddsnotiser, Stockh.*, **22**, 1, pp. 14–15, 1 fig., 1958.

A summary of the available information on onion white rot is given in connexion with its recent appearance in Öland, this being the 1st record for Sweden [map 331].

ROSBERG (D. W.) & JOHNSON (H. B.). **Post-harvest infra red irradiation for the control of graymold neck rot disease of Onions.**—Abs. in *Phytopathology*, **48**, 6, p. 345, 1958.

The freshly cut necks of Excel onions were inoculated with spores of *Botrytis allii* [cf. **34**, p. 17]; the bulbs were incubated for 24 hr. at 75% R.H. and then irradiated for 6 min. at 6 in. from the lamp. After storage at 34° F. for 9 weeks total decay in

irradiated onions was 4·4% and 98% in non-irradiated; at ordinary storage temps. the percentages were 12·3 and 97·5.

Yamaguchi (M.), Howard (F. D.), & Minges (P. A.). **Brown checking of Celery, a symptom of boron deficiency. III. Effects of potassium, nitrogen, and boron in culture solutions on the physiological disorder and nutrient uptake.**—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 455–467, 1 fig., 1958.

In a further study in this series [**37**, p. 63] the effect of K and of B and the interaction of N and B on the deficiency symptoms were significant. Two foliar sprays with 1·5% boric acid were sufficient to correct the deficiency in Utah 10-B and Summer Pascal grown in nutrient solutions.

Baxter (J. W.). **Reaction of Rhubarb and Buckwheat to inoculation with Reed Grass rust.**—*Plant Dis. Reptr*, **42**, 8, p. 989, 1958.

At the University of Wisconsin, Milwaukee, using teleutospores of *Puccinia phragmitis* from *Phragmites communis* in Nebraska to inoculate rhubarb and *Rumex crispus* in the field and buckwheat in the greenhouse, aecidia were obtained on all 3 hosts. No pycnia were observed.

Zink (F. W.) & Smith (P. G.). **A second physiologic race of Spinach downy mildew.**—*Plant Dis. Reptr*, **42**, 6, p. 818, 1958.

In Mar. 1958 widespread infection by *Peronospora effusa* [**36**, p. 507] occurred on the previously immune Califlay spinach var. in the Salinas Valley of California. Other vars. bred for immunity were infected on inoculation, and it is concluded that a 2nd physiologic race of the fungus has appeared. U.S. Dept of Agric. line 99×95 showed signs of resistance.

Valentin (H.). **Das Gurkengelbmosaik (Cucumis virus 2 A, Smith).** [Cucumber yellow mosaic (*Cucumis* virus 2 A, Smith).]—*NachrBl. dtsch. PflSchDienst (Braunschweig), Stuttgart*, **10**, 6, pp. 93–94, 3 fig., 1958.

From the Institut für Gärtnerische Virusforschung, Berlin-Dahlem, is reported an outbreak of *Cucumis* virus 2 A [strain of cucumber green mottle mosaic: cf. Smith, **36**, p. 303] in cucumbers growing under glass in a Berlin nursery. The symptoms were distinct from those of green mottle mosaic [cf. **35**, p. 269]. Affected plants were stunted and the upper leaves occasionally shrivelled. On the foliage initial symptoms were vein clearing and a pale yellow mosaic with asteroid spots, progressing to a silvery white mosaic sometimes accompanied by veinbanding, which was occasionally marked at high temperatures; discoloured patches appeared on the petioles and stems. The crop was rendered unmarketable by yellowing and the presence of noticeable white depressions which enlarged with maturity. The virus, which was sap-transmissible, persisted in dried material and its infectivity was unimpaired in sap kept for 150 days. For a 10 min. exposure the thermal inactivation point lay between 80 and 90° C.

Busch (L. V.) & Walker (J. C.). **Studies of Cucumber anthracnose.**—*Phytopathology*, **48**, 6, pp. 302–304, 9 fig., 1958.

From studies at the Ontario Agricultural College, Guelph, and the University of Wisconsin, Madison, it was concluded that resistance to *Colletotrichum lagenarium* in the cucumber P.I. 175111 was a monogenic character, whereas in P.I. 163213 [**37**, p. 624] either more than 1 pair of genes was involved or modifying genes played an influential part, and in P.I. 163217 inheritance appeared to be multigenic [cf. **32**, p. 465; **37**, p. 437]. Penetration was similar in both P.I. 175111 and the susceptible National Pickling [cf. below]; appressoria formed within 8 hr., chiefly above the side walls of the epidermal cells, and infection pegs developed within 68 hr. from a germ

pore in the appressorial wall. In susceptible leaves intracellular invasion of the mesophyll took place, the cells collapsed, and the mycelium invaded the vascular tissue. In resistant tissue the mycelium was less prevalent, cytoplasts and chloroplasts remained intact longer in cells in advance of the mycelium, and these cells developed on the outside of the walls bead-like areas, staining deep red with Conant's quadruple stain, which increased in size and sometimes filled the intercellular spaces, with occasional wall thickening. The other 2 resistant vars. behaved similarly.

Akai (S.) & Terasawa (H.). **The varietal resistance of Cucumber to anthracnose and the behaviour of the causal fungus in the invasion of the host tissues.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 113–118, 1957. [Japanese. Abs. from English summary.]

Varietal differences in susceptibility to *Colletotrichum lagenarium* [cf. below] of cucumber vars. are reported. The squashes tested (*Cucurbita maxima* and *C. moschata*) were not susceptible. Conidial germination was accelerated in sap from cotyledons of the cucumber vars. and all tissues proved highly susceptible. There was no varietal difference in conidial germination in water drops from cotyledon surfaces, but the degree of hyphal penetration varied significantly between vars. [cf. above]; there was a high correlation between the number of penetration hyphae and the number of lesions/unit area.

Yasumori (H.). **Some observations on the invasion of the anthracnose fungus, Colletotrichum lagenarium into Cucumber plants.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 119–122, 3 fig., 1957. [Japanese. Abs. from English summary.]

Equally abundant appresoria were observed within 24 hr. after inoculating leaves of the resistant Taiwan-Kema and the susceptible Suyo cucumbers [cf. above]. Collapse of chloroplasts occurred in both 94 hr. after inoculation and lesions formed after 5 days. The vars. did not differ in thickness of cuticle or epidermal morphology; the susceptibility of both was considerably increased by wounding.

Husain (A.) & Rich (S.). **Extracellular pectic and cellulolytic enzymes of Cladosporium cucumerinum.**—*Phytopathology*, **48**, 6, pp. 316–320, 4 graphs, 1958.

At Connecticut Agricultural Experiment Station, New Haven, large amounts of extracellular polygalacturonase were produced by *C. cucumerinum* [**34**, p. 76] in dextrose cultures, but little or none on citrus pectin; no pectin methylesterase was detected. Extracellular cellulase was produced on filter paper, wood cellulose, or carboxymethylcellulose, but very little on dextrose. Sap from resistant and susceptible cucumber vars. had no effect on cellulase activity. At 0·1% ferbam, ziram, nabam, dichlone, and 2-pyridinethiol-1-oxide partially inhibited polygalacturonase activity; of the metallic ions tested against cellulase only Hg was inhibitory.

Kajiwara (T.) & Iwata (Y.). **Observations on the sporulation of Cucumber downy mildew.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 201–203, 1 pl., 1957. [Japanese. Abs. from English summary.]

Successive stages in the sporulation of *Pseudoperonospora cubensis* on a cucumber leaf [**33**, p. 136] are described with photomicrographs.

Komuro (Y.). **Studies on a mosaic disease of Squash in Japan. 1. Its symptoms, host range, and transmission. 2. Physical properties and identification of its causal virus, with special reference to the relationship to the virus from mosaic plants of White Gourd, Oriental Pickling Melon and Watermelon.**—*Ann.*

phytopath. Soc. Japan, **21**, 4, pp. 162–166, 3 fig., 1956; **22**, 4–5, pp. 220–224, 1 fig., 1957. [Japanese. Abs. from English summary.]

The symptoms of a mosaic disease of squash and pumpkin in Japan include faint vein clearing and green leaf mottling followed by veinbanding, and finally severe distortion and reduction of the leaves to veins only with patches of mesophyll. The causal virus is transmitted mechanically and also by *Aphis gossypii* and *Myzus persicae*; it proved 0·6% seed-borne in some squash vars. and is practically confined to cucurbits. It is inactivated by exposure to 55° C. for 10 min., by $\frac{1}{500}$–$\frac{1}{1000}$ dilution, and 5–10 days' ageing at room temp. It did not give protection against cucumber mosaic virus, and appeared to be a strain of melon mosaic virus [**36**, p. 299].

Nishimura (S.). **Pathochemical studies on Watermelon wilt. (Part 5.) On the metabolic products of Fusarium oxysporum f. niveum (E. F. Smith) Snyder et Hansen. (1)**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 215–219, 3 fig., 4 graphs, 1957. [Japanese. Abs. from English summary.]

These further studies on *F.* [*bulbigenum* var.] *niveum* [cf. **36**, p. 511] include a chromatographic method indicating the amount of fusaric acid present, one of the metabolic products of the pathogen responsible for the development of the disease symptoms [cf. below]. It was detected in soils infested by the pathogen.

Reid (J.). **Studies on the Fusaria which cause wilt in Melons. I. The occurrence and distribution of races of the Muskmelon and Watermelon Fusaria and a histological study of the colonization of Muskmelon plants susceptible or resistant to Fusarium wilt. II. The effect of light, nutrition, and various chemicals on the sporulation of certain fusarial isolates, and preliminary investigations on the etiology of wilting of the Muskmelon Fusarium.**—*Canad. J. Bot.*, **36**, 3, pp. 393–410, 3 pl., 1 map; 4, pp. 507–537, 16 fig., 1958.

In a study at the University of Toronto of 290 isolates of *F. bulbigenum* var. *niveum* [cf. **31**, p. 473] from muskmelon and 99 from watermelon, 10 or more cultural races were distinguished on each host, the standard races (F23 and F14, respectively) being the most widespread. In inoculation tests on the susceptible muskmelon Benders' Surprise and the resistant Iroquois, and the watermelon var. Peerless, differences in pathogenicity were demonstrated among the cultural races but isolates of any one race were consistent in their behaviour. The field reactions of host varieties proved to be a function of the races present, which varied in their virulence and distribution.

Penetration of Benders' Surprise took place between cells in the region of root elongation, intercellular, later intracellular, colonization of the cortex being followed by penetration of the stele and establishment in the vessels, leading to more generalized distribution. The primary meristem was also invaded and penetration occasionally occurred through the cortex damaged by emerging secondary roots. The resistant Iroquois was colonized similarly, but invasion took place to a lesser degree, though no mechanical barrier or other morphological differences could be seen.

In muskmelon disease was at a max. at a soil temp. of 20° C. and incidence was still high at 30°, but fell rapidly at 35°, the high temp. apparently reducing the aggressiveness of the parasite rather than increasing the resistance of the host.

Increase in light intensity favoured macrospore production and the macro-microspore ratio in cultures of several *F.* spp.; colony growth was appressed and pigmentation sometimes occurred. The C and N sources also affected growth and sporulation depending on the isolate, C source being an important factor modifying the effect of enzyme inhibitors. At least 3 substances which could contribute to wilting [cf. above] were produced by the muskmelon *Fusarium*: a thermostable,

non-dialysable protein, possibly an enzyme, and a thermostable, low molecular weight carbohydrate, both producing wilt in cuttings, and also a thermostable substance, partially dialysable and stable over a wide pH range, causing wilt in intact plants. There was a significant interference in translocation in affected plants.

Winstead (N. N.), Wells (J. C.), & Reid (W. W.). **Botrytis in Pepper seedbeds and on young plants in the field.**—*Plant Dis. Reptr*, **42**, 8, pp. 981–982, 1 fig., 1958.

From Raleigh and Faison, N. Carolina, infection of *Capsicum frutescens* by *Botrytis cinerea*, which caused 75% or more loss in severely infected beds, is reported for the 1st time; it occurs especially when high humidity prevails under plastic or other covering. Experimental control was obtained with a mixture of captan and PCNB (1:1½ lb.)/100 gal. water applied as a drench at ½ gal./sq. yd. at 5-day intervals.

Chattopadhyay (S. B.) & Sen Gupta (S. K.). **Wilt of Egg-plant (Solanum melongena L.).**—*Indian J. mycol. Res.*, **2**, 1–2, pp. 83–86, 1956. [Received Aug. 1958.]

At the State Agricultural Research Institute, Calcutta, a wilt of eggplant in W. Bengal was found to be caused by *Fusarium solani* [cf. **33**, p. 758]; pathogenicity was proved on Sutton's Long Purple.

Walters (H. J.). **A virus disease complex in Soybeans in Arkansas.**—Abs. in *Phytopathology*, **48**, 6, p. 346, 1958.

In 1955–6 soybeans in the Arkansas River Valley developed a variety of symptoms including green mottling, poor pod development, floral bud proliferation, nodal swelling, dropping of immature pods, and failure of plants to mature. Losses were generally not severe. Differential host reaction and physical properties indicated the presence of the viruses of soybean mosaic, pod mottle, yellow stipple, and a 4th unidentified one [cf. **37**, pp. 651, 130].

Ochs (Gertrud). **Untersuchungen über die Verbreitung der Rebenviren durch Vektoren.** [Studies on the spread of Vine viruses by vectors.]—*Naturwissenschaften*, **45**, 8, p. 193, 1958.

In experiments at the Botanisches Institut, University of Freiburg-im-Breisgau, Germany, infectious degeneration virus of vines was transmitted by *Eriophyes vitis*, *Phylloxera vastatrix*, *Otiorrhynchus sulcatus*, *Doralis* [*Aphis*] *fabae*, *Myzus persicae* (after only 5 min. feeding), and a number of root-attacking nematodes. Of the other 2 vine viruses recently identified by the author [see below], deformation was transmitted by nematodes.

Ochs (Gertrud). **Über drei Viren als Erreger von Rebkrankheiten.** [Concerning three viruses as agents of Vine diseases.]—*Z. PflKrankh.*, **65**, 1, pp. 11–17, 10 fig., 1958. [English summary.]

Commenting on the importance of differentiating the viroses of the vine encountered in Germany from infectious degeneration, the author reports studies on viruses isolated from vines exhibiting various symptoms. The 'Panaschüre' isolates (virus 1), producing a leaf mosaic in vine [**37**, p. 438], caused systemic infection in Samsun tobacco, characterized by a clearing and a fine, initially chlorotic and later necrotic, streaking of the veins. Inoculated leaves of *Chenopodium quinoa* [**35**, p. 269] developed local, circular, brownish necrotic lesions with a clear border. On cucumber cotyledons lesions were followed by vein-clearing and pale green mosaic of the foliage leaves, which later became necrotic. In all these hosts initial symptoms appeared in 1–6 days.

The virus in expressed sap was inactivated by dilution to 1:5,000, heating above 64° C., or standing more than 4 days at room temp. Virulent strains remained active for years in desiccated leaf tissue. Transmission from tobacco to tobacco was effected by *Cuscuta campestris* and *Myzus persicae*, and from vine to [unspecified] test plants by *Eriophyes vitis*. The virus, which had small, spherical particles and is considered to belong to the cucumber mosaic group, was isolated from *Galinsoga parviflora*, *Sonchus oleraceus*, *Mercurialis annua*, *Chenopodium album*, and lucerne; 11 strains were found in vine.

Isolates from vine with a yellow mosaic produced (after a latent period of 10–12 days) much more severe symptoms in the test plants; they were a mixture of viruses 1 and 2. In Samsun and White Burley tobacco, virus 2 caused a veinclearing, with chlorotic, later necrotic, flecking of the interveinal tissue. Symptoms on *Datura metel* were similar. *Solanum demissum* hybrid A6 [**33**, p. 172] developed discrete, annular, necrotic spots.

In expressed sap the dilution end-point was 1:10,000, thermal death-point 59°, and longevity 18 days. Virus 2 was transmitted by *Myzus persicae*, but not by *Cuscuta campestris*. It was not present in the vineyard weeds examined. The particles were filiform and slightly bent, indicating an affinity with [potato] virus Y, which was subsequently confirmed by differential-diagnostic investigations and serological tests. Isolates from various vine-growing areas were identical.

Virus 3, isolated from vines with stunted growth and leaf deformation, was readily transmissible in sap and produced symptoms in 8–10 days. On Samsun tobacco annular, linear, or oak-leaf chlorotic patterns occurred, later becoming necrotic. On *D. stramonium* there was a dappled, partly necrotic mosaic, and on *Gomphrena globosa* round, pale, necrotic lesions with reddish borders.

This virus retained its activity at 1:100,000, but was inactivated at 70° and on standing at room temp. for 22 days. It remained infective in desiccated leaves over a long period. Transmission was not effected by *C. campestris* or *M. persicae* or other vineyard insects, nor was the virus present in the vineyard weeds examined. The rod-shaped particles, symptomatology, and serological reactions indicated that the virus belonged to the [potato] virus X group. Several strains were distinguished. In mixed infections with the other 2 viruses the stunting effect was more severe and various leaf discolorations occurred.

Ochs (Gertrud). **Untersuchungen über den Einfluß eines phytopathogenen Virus auf den Wuchsstoffhaushalt der Rebe.** [Studies on the influence of a phytopathogenic virus on the hormone economy of the Vine.]—*Naturwissenschaften*, **45**, 14, p. 343, 1958.

Using paper-chromatographic methods, the β-indoleacetic acid contents of vine shoots severely and mildly infected by the 'deformation' virus [virus 3: cf. above] were found to be 10^{-4} and 10^{-5} g./ml., respectively, compared with 10^{-6} for healthy material. The corresponding tryptophane values were $2 \cdot 10^{-8}$, $4 \cdot 10^{-5}$, and 10^{-3}, respectively.

Ochs (Gertrud). **Untersuchungen über den Wirtspflanzenkreis von drei Rebenviren.** [Studies on the host plant range of three Vine viruses.]—*Naturwissenschaften*, **45**, 15, p. 370, 1958.

Of the 3 recently discovered components of the vine infectious degeneration virus complex [cf. above] 'panaschüre' [virus 1] was detected in 82 hosts in 36 families, 'jaune canare' [viruses 1+2] in 17 in 1 family, and 'deformation' [virus 3: see above] in 11 in 3 families. Of ecological importance in practice is panachure, among its hosts being 11 indigenous vineyard weeds and 10 profitable crops which are widely used for interplanting with vines in southern countries.

Verderevsky (D. D.) & Naydenova (Mme I. N.). Причины устойчивости невосприимчивых к мильдью сортов Винограда. [The causes of resistance in mildew resistant Vine varieties.]—Садов. Виноградст. Винодел. [*Sadov. Vinogradst. Vinodel.*], *1958*, 4 (76), pp. 53–57, 4 fig., 1 graph, 1958.

An extensive study on the peristomatal necrosis caused by *Plasmopora viticola* in vine [cf. **36**, p. 571], developing shortly after infection in resistant and susceptible vars. The resistant American var. 101–14 exerted a powerful fungitoxic action, causing the movement of zoospores to cease in 28 sec. compared with 163 in the susceptible var. Shasla. The growth of haustoria penetrating the leaf tissues of resistant vars. is also arrested.

Kovacs (A.). **La 'muffa grigia' causata dalla Botrytis cinerea.** ['Grey mould' caused by *Botrytis cinerea.*]—*Ital. agric.*, **95**, 1, pp. 79–81, 1 col. pl. (on cover), 1958.

This is an up-to-date report from the Istituto di Patologia Vegetale, University of Bologna, on the symptoms and control of *B. cinerea*, with special reference to the vine. Outstanding among new commercial fungicides is captan at 0·2–0·5%. Good results are further reported from Switzerland and Germany with B-500, based on bromo-chloro-oxyquinoline, while mercurials, e.g., 0·1–0·5% ceresan, have also proved efficacious.

Nelson (K. E.). **Some studies of the action of sulfur dioxide in the control of Botrytis rot of Tokay Grapes.**—*Proc. Amer. Soc. hort. Sci.*, **71**, pp. 183–189, 1 graph, 1958.

At the University of California, Davis, it was found that the fungistatic effect of SO_2 on *B. cinerea*, which requires 6–18 hr. of saturated moisture conditions at 20° C. to infect mature grapes [**35**, p. 864], was proportional to the time of exposure [cf. **36**, p. 374]; after infection the fungus was unaffected by 45 min. exposure to 1% SO_2 in air, nor was it eradicated from intact grapes by 8 hr. of 0·7% SO_2, though 20 min. killed it in open lesions. Such fruits had higher total SO_2 content than intact berries; free SO_2 decreased in both open and intact berries with the time. Exposure of stored fruit to 0·25% SO_2 for 10 min. or more did not check the spread of the fungus appreciably. Concs. high enough to eradicate the fungus harm the fruit.

Isarlishvili (S. Y.). Изучение микофлоры ризосферы Виноградной Лозы. [Study of the fungal flora in the rhizosphere of Grape Vines.]—*Trud. Inst. Zashch. Rast. Acad. Sci. Georgia*, **12**, pp. 125–136, 1 diag., 1957.

In an extensive analysis at the Botanical Institute, Georgian Academy of Science, Tbilisi, U.S.S.R., of the rhizosphere population of vines, 84 fungi and actinomycetes were recorded; the time of the year when they were isolated and the district where they were most prevalent are given. Most were found at a depth of 40–60 cm. Var. 420–A had the richest rhizosphere flora.

Veldeman (R.) & Welvaert (W.). **Onderzoek van de luchtschimmelflora.** [Study of the fungus flora in the air.]—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 561–572, 1957.

At the Rijkslandbouwhogeschool, Gent, Belgium, a Hirst spore trap operated in a plantation of young poplars from 18–31 Aug. [? 1956] and 1–13 Apr. trapped spores on slides coated with wax soluble in water. In cultures grown from trapped spores (46 genera were represented) *Dothichiza* was identified.

Diseases and pests on horticultural planting material. A guide to their recognition. —Second edition, iv+38 pp., 83 pl., London, H.M. Stationery Office, 1958. 7*s.* 6*d.*

The 1st edition [**34**, p. 385] of this booklet has been revised by P. Aitkenhead and

J. J. Baker but the layout remains unaltered. Its aim is to provide a practical guide to disease symptoms for plant inspectors who are mainly concerned with dormant or semi-dormant material in transit.

Gill (N. T.) & Vear (K. C.). **Agricultural botany.**—viii+636 pp., 262 fig., London, Gerald Duckworth, 1958. 63*s*.

Section 4 of this book (pp. 501–606) is on diseases of farm crops.

Stapp (C.). **Pflanzenpathogene Bakterien.** [Plant-pathogenic bacteria.]—259 pp., 96 fig., 2 diag., 2 graphs, Berlin and Hamburg, Paul Parey, 1958. DM. 32.

This well-produced book is intended to be complementary to the bacterial section of Sorauer's Handbuch, recently revised by the same author [**35**, p. 881]. Thus it covers the literature from 1953 onwards, which was largely omitted from the Handbuch, and deals thoroughly with bacteriological techniques.

The general section (pp. 18–67) covers cultural techniques, diagnostic procedures, and serological reactions, with brief notes on identification by use of bacteriophages and on nomenclature. The Special Section (pp. 68–239) comprises detailed accounts of 24 bacterial pathogens encountered in Central Europe, with a separate bibliography for each. There is a subject index.

Wakimoto (S.). **A simple method for comparison of bacterial populations in a large number of samples by phage technique.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 159–163, 1957. [Japanese. Abs. from English summary.]

The method consists of suspending samples of bacteria, made up to 10^{3-5}/ml. with phage suspension, in CaVfCh or potato semi-synthetic media, and incubating in shakers (80 r.p.m.) at opt. temp. for 3 hr. Aliquots of centrifuged supernatant (6,000 r.p.m., 5 min.) are then plated out together with the indicator bacteria (*Xanthomonas oryzae*) [cf. **36**, p. 123] to make plaque countings, which are usually proportional to the number of bacteria in the initial sample.

Wakimoto (S.). **Protective effects of various materials against the drying inactivation of Xanthomonas oryzae phage (OP phage).**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 243–250, 2 fig., 1957. [Japanese. Abs. from English summary.]

An account of the protective effects of protein, protein hydrolysates, and amino acids against desiccation of *X. oryzae* phage [see above].

Goto (M.) & Okabe (N.). **Studies on the strains of Erwinia carotovora (Jones) Holland. II. Heat inactivation of flagellar and somatic antigens.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 268–273, 1957. [Japanese. Abs. from English summary.]

In these further studies [cf. **37**, p. 138] it is noted that flagellar antigens of 12 serotypes heated at 50–80° C. for 10 min. and agglutinated by their homologous antisera were variously inactivated at temps. between 58° and 78°, the different temps. of inactivation being correlated in some cases with the antigenic components.

Goto (M.). **Recent development in the classification of phytopathogenic bacteria. III. Gram-positive bacteria and crown gall bacteria.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 276–279, 1957. [Japanese.]

A continuation of the author's review of the subject [cf. **37**, p. 443].

Welvaert (W.) & Veldeman (R.). **Invloed van chemische grondontsmettingsmiddelen op de grondschimmelflora.** [Influence of chemical soil disinfectants on the soil fungus flora.]—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 499–504, 1957. [English summary.]

Tests of normal garden soil were made before and 3 days after treatment with 6

commercial products, used as soil disinfectants against fungi, by plating samples on a mineral salts-peptone-dextrose agar+rose bengal. Cheshunt compound had no appreciable effect on the fungus flora (fungi were identified to genera—about 58 in all); an organic mercurial was more effective against *Penicillium*, *Trichoderma*, and *Acrostalagmus*, and less against *Fusarium* and *Mortierella*; oxyquinoline sulphate was a little more than 50% effective generally. Practically complete elimination of fungi was obtained with chloropicrin, formalin, and chlorobromopropene.

Takeuchi (H.) & Ide (H.). **Studies on the soil fungicides. I. Fungicidal action of the organic mercury compounds in the soil.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 197–200, 1 fig., 4 graphs, 1957. [Japanese. Abs. from English summary.]

Four organic Hg compounds were assayed against *Ophiobolus* [*Cochliobolus*] *sativus* as soil-fungicide mixtures and the soil and filtrate were assayed again after washing. The results suggested that methyl mercury iodide combines with soil without losing fungicidal activity. Ethyl mercury phosphate was fairly fungicidal initially but lost its activity after washing. Methoxy ethyl mercury chloride and phenyl mercury acetate were both poorly fungicidal throughout, though the filtrate of the former retained some activity [cf. **24**, p. 199].

Domsch (K. H.). **Die Wirkung von Bodenfungiziden. I Wirkstoffspektrum.** [The action of soil fungicides. I Active material spectrum.]—*Z. PflKrankh.*, **65**, 7, pp. 385–405, 1958. [58 refs. English summary.]

At the Institut für Getreide, Ölfrucht-, und Futterpflanzenkrankheiten, Kiel-Kitzeberg, Germany, 29 products (mostly recommended as soil fungicides) were examined for their fungitoxic and fungistatic activity against *Pythium* sp., *Rhizoctonia* [*Corticium*] *solani* (2 strains), and *Fusarium culmorum*, by means of (1) Zentmyer's method [**35**, p. 30]; (2) a modification of this, permitting the calculation of ED_{50} values; and (3) a method in which graded concentrations of the fungicide were incorporated in the soil, which was then inoculated with the test fungus, sown with healthy pea seeds, and incubated (6 days at 8° C., then 6 at 20 or 25°), the performance of the seed giving a measure of fungicidal activity (further details to be published).

Among the soil disinfectants (for which the 1st method is recommended) chloropicrin, vapam, and methyl bromide were best, while among the products harmless to growing plants (for which method 3 is recommended) captan, thiram, and zineb, each active against at least 2 of the pathogens, were best.

For each of the fungicides used there are notes as to effective doses, phytotoxic levels, activity against particular fungi, etc., followed by a short bibliography.

Georghiou (G. P.). **Pest control materials.**—*Bull. Dept Agric. Cyprus* B-2, 49 pp., 1957.

This bulletin lists the trade names and distributors of proprietary compounds and the concentration of their main ingredients. Section III (pp. 30–37) covers fungicides.

Shapiro (S.). **The evaluation of fungicides for use in paints.**—Repr. from *Off. Dig. Fed. Paint Varn. Prod. Cl.*, Apr. 1958, 17 pp., 6 fig., 1958.

To assay the fungicides [cf. **37**, p. 573] they were mixed with an iron oxide—linseed oil paint (composition tabulated), susceptible to mildew, and *Aspergillus niger* ATCC 10,535, and *A. oryzae* ATCC 10,196 used as test organisms, in Petri dishes incubated at 28–30° C. at R.H. 85–90%. Treated wood panels were also exposed in a tropical test chamber (8 hr. at 85° F. and 90% R.H., 8 hr. gradual change to 75° and 95% R.H., maintained for 4 hr., and then 4 hr. gradual change back to 85°

and 90% R.H.). Field evaluation was by application of the paints to wooden buildings. Results showed a number of fungicides to give similar performances, but that 4% tetrachlorophenol was the most effective fungicidal additive for paints.

Takamura (Y.). **Inhibition of TTC reduction of the mycelial homogenates of the Rice-blast fungus by fungicides.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 225–229, 2 graphs, 1957. [Japanese. Abs. from English summary.]

An account of the chemical methods used and the results obtained in experiments with *Piricularia oryzae*.

Misato (T.), Ishii (I.), Asakawa (M.), & Fukunaga (K.). **Assay of some antifungal antibiotics using Piricularia oryzae as the test organism.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 183–187, 7 graphs, 1957. [Japanese. Abs. from English summary.]

An account of methods for microbiological assay of antifungal antibiotics, using *Piricularia oryzae* as the test organism, with special reference to the assay of blasticidin by the cup technique, and of antimycin A and blastmycin by the paper disk method.

Proceedings of the first international conference on the use of antibiotics in agriculture.—*Publ. nat. Acad. Sci. nat. Res. Council* 397, xx+278 pp., 22 fig., 11 graphs, 1956. $2.50. [Received Aug. 1958.]

This conference, held at Washington, Oct. 1955, was concerned primarily with the use of antibiotics in animal husbandry and public health, but W. J. Zaumeyer (pp. 172–187; 70 refs.) dealt with the improvement of plant health by antibiotics [cf. **36**, p. 338]. His references to various plant diseases so controlled have mostly been noticed in this *Review*.

Van Assche (C.). **Bestrijding van plantenziekten met antibiotica. Speciale zaadbehandeling tegen Ustilago tritici.** [Control of plant diseases with antibiotics. Special seed treatment against *Ustilago tritici*.]—*Meded. LandbHogesch. Gent*, **22**, 3, pp. 505–516, 2 fig., 1957. [English, French, and German versions.]

At the Landbouwinstitut, University of Louvain, Belgium, wheat seed samples artificially infected with *U. tritici* [*U. nuda*] produced healthy plants after treatment with humulon and lupulon dissolved in hexane. The presence of infection was determined by microscopic examination of the leaves and seeds.

Nystatin and actinomycin were effective as seed disinfectants at 500 p.p.m. and 300 p.p.m., respectively. The use of nystatin in conc. cellulose acetate (5%) results in slower absorption of the antibiotic. The absorption by and stability of the antibiotic in the plant were tested by introducing a sample of leaf tissue into a culture of the fungus. With agromycin used against *Micrococcus tritici* causing disease of wheat grain and *Xanthomonas translucens* on leaves a notable parallelism was obtained between the increasing quantity of antibiotic on the one hand, and the effective dose (200 p.p.m.), the stimulation of growth, formation of anthocyane (1,000 p.p.m.), and lethal dose on the other.

List of intercepted plant pests, 1956 ; 1957.—*S.R.A. Bur. Ent., Wash.*, 63 pp., 1956; 66 pp., 1957.

Interceptions from plant material entering United States Territory between 1 July 1955, and June 1956 [cf. **36**, p. 376], included *Puccinia asparagi* on asparagus [map 216] from Greece, *Uromyces transversalis* on a gladiolus leaf from the Union of South Africa, *Diaporthe citri* on grapefruit [map 126] from Ecuador, *Phoma* [*Guignardia*] *citricarpa* [map 53] on various citrus fruits from Portugal, the Philippines, and Indo-China, and *Eudarluca australis* on chrysanthemum from Japan. Interceptions 1956–7 included *Pseudopeziza ribis* on leaves of European black currant from Germany, *Xanthomonas malvacearum* [map 57] on cotton leaf from the

Bahamas, *Melampsora populnea* on European aspen from Germany, and *Puccinia allii* on garlic and *Urocystis cepulae* on onion [map 12] from Israel.

Clode (J. J. E.). **As micorrizas na migração do fósfora.** [The role of mycorrhiza in the translocation of phosphorus.]—*Publ. Dir. Serv. Flor. Agric., Lisboa*, **23**, 2, pp. 167–202, 7 pl., 5 graphs, 1956. [English summary. 54 refs. Received 1958.]

Studies in Portugal with seedlings of *Pinus radiata* with and without mycorrhiza and using labelled P [cf. **32**, p. 628] showed P uptake to be greater by mycorrhizal plants, and more so in the roots than the above-ground parts, which, however, contained more P in the absence of mycorrhiza. On mycorrhizal roots the P concentration was greater in the fungal sheath than in the adjoining tissues.

Bernier (B.). **The production of polysaccharides by fungi active in the decomposition of wood and forest litter.**—*Canad. J. Microbiol.*, **4**, 3, pp. 195–204, 1 pl., 1 graph, 1958. [20 refs.]

Pullularia pullulans, *Polystictus versicolor*, *Lenzites betulina*, and *Marasmius dryophilus* [cf. **34**, p. 816], which decompose wood and forest litter, were grown at the Forestry Dept, University of Oxford, on an artificial medium containing salts and glucose, and on several media of plant debris extracts. It was observed by chromatography of the hydrolysates that similar polysaccharides were formed by the same fungi on different media. Synthesis of polysaccharides on litter extracts was sometimes inhibited by lack of carbohydrates and in many cases by some unknown factor or factors even in very dilute extracts.

Dowding (E[leanor] S.). **Nuclear streaming in Gelasinospora.**—*Canad. J. Microbiol.*, **4**, 3, pp. 295–301, 2 pl., 5 fig., 1958.

An account of observations at the University of Alberta, Edmonton, and a suggested explanation of the mechanism of streaming.

Naito (N.), Tani (T.), & Higashi (S.). **An antibiotic substance purely isolated from the culture filtrates of Gloeosporium olivarum which was grown in the presence of MCP.**—*Ann. phytopath. Soc. Japan*, **22**, 2, pp. 93–96, 1957. [Japanese. Abs. from English summary.]

In further studies of this antibiotic produced in the presence of 0·03% MCPA [**37**, p. 141] dilutions of 1:5,000 inhibited completely the growth of *G. olivarum* and *Cochliobolus miyabeanus*, the end point dilutions for the 2 fungi being about 1:40,000 and 1:30,000, respectively.

Naito (N.) & Kojima (Y.). **The morphological characteristics of the colonies of several fungi in agar media containing 2,4-D and related phenoxy compounds.**—*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 193–196, 3 fig., 1 diag., 1957. [Japanese. Abs. from English summary.]

Observations on the effect of certain media on the growth of colonies of *Gloeosporium olivarum*, *G. kaki*, *Schizophyllum commune*, and *Cochliobolus miyabeanus* [cf. above], the irregularities of colony shapes described being characteristic of 'staling' growth [cf. **4**, p. 627 and below].

Naito (N.). **Production of fungitoxic substance by fungi grown on media containing either 2,4-D or related phenoxy compounds.**—*Jap. J. Bot.*, **16**, 2, pp. 153–162, 9 graphs, 1958.

An account of further studies at Kagawa University, Japan [cf. **37**, pp. 76, 141 and above], on the effect of media containing 2-chlorophenoxy-acetic acid, 2-methyl-

phenoxyacetic acid, 2-methylphenol, 2-chlorophenol, or 2,4-dichlorophenol on the production of fungitoxin by *Gloeosporium olivarum*, *G. kaki*, *Schizophyllum commune*, *Helminthosporium sigmoideum*, and *Cochliobolus miyabeanus*.

MARTIN (S. M.). **Production of extracellular polysaccharides by Mucor racemosus.**—*Canad. J. Microbiol.*, **4**, 3, pp. 317–319, 2 graphs, 1958.

A short account of investigations at the National Research Laboratories, Ottawa, on the changes in the constituents of the polysaccharides during growth of *M. racemosus* [**36**, p. 490].

HIRATA (S.). **Studies on the phytohormone in the malformed portion of the diseased plants. 3. Auxin formation on the culture grown Exobasidium, Taphrina and Ustilago spp.**—*Ann. phytopath. Soc. Japan*, **22**, 3, pp. 153–158, 1957. [Japanese. Abs. from English summary.]

Further experiments [cf. **37**, p. 142] carried out on 15 spp. of *Exobasidium*, 5 of *Taphrina*, and 8 of *Ustilago* indicated that culturing for 15 days in liquid media at 23° C. resulted in more abundant auxin formation, as measured by the *Avena*-coleoptile test, than after 30 days. The rate of growth and auxin formation in Czapek's medium with KNO_3 as N source was much slower than in potato media. Substituting L-tryptophane for KNO_3 increased the production of auxin and also that of indole acetic acid. *U. nuda* from wheat and barley produced auxin in large quantities and this may have a bearing on the physiology of its parasitism [cf. **31**, p. 553].

KURODA (S.). **The mode of respiration of Cochliobolus miyabeanus during conidial germination.**—*Ann. phytopath. Soc. Japan*, **22**, 2, pp. 88–92, 1957. [Japanese. Abs. from English summary.]

The effect of various carbohydrates on the germination of conidia of *C. miyabeanus* was studied in buffered solutions. Pyruvate, succinate, fumarate and ethanol (but not citrate) were as efficient as glucose in increasing the percentage of germination, indicating respiration through the C_4-dicarboxylic acids cycle. As germination was increased by addition of glucose+citrate, and was inhibited by glucose+streptomycin or glucose+monofluoroacetate, oxidation in the course of respiration is assumed to follow the tricarboxylic acid cycle. Germination is inhibited by carbon monoxide, suggesting that the terminal oxidase of the system is related to cytochrome oxidase.

GÄUMANN (E.), KERN (H.), SCHUEPP (H.), & OBRIST (W.). **Der Einfluß der Fusarinsäure auf den Wasserhaushalt abgeschnittener Tomatensprosse.** [The influence of fusaric acid on the water economy of cut Tomato shoots.]—*Phytopath. Z.*, **32**, 3, pp. 225–244, 2 fig., 7 graphs, 1958. [English summary.]

In further studies [**36**, p. 791] at the Eidgenössischen Technischen Hochschule, Zürich, tomato shoots given a massive dose of fusaric acid [**36**, p. 503], e.g. 100–200 mg./kg. fresh weight, during the 1st hr. suffered an immediate paralysis of the entire water turnover, which was reduced by half within 3–5 hr. If poisoning is slow, however (e.g. at 20 mg./kg.), there is first an increase. In both cases water intake and transpiration run parallel, hence the shoots suffer no water loss in the 1st phase.

With the appearance of necroses, usually when the average conc. of fusaric acid in the shoots reaches $1{\cdot}9–5{\cdot}4 \times 10^{-3}$ M., but more slowly at lower concs., the water turnover is further reduced, but more slowly than before. Transpiration is constantly higher than water intake, so that the shoots lose first their humidity and then their turgor.

Sirry (A. R.). **The effect of ultra violet light on Botrytis species in culture and on host plants.**—*Ann. agric. Sci., Cairo*, **2**, 1, pp. 201–207, 1 graph, 1957. [Arabic summary.]

Ultra-violet light (2,150–3,000 A) checked the growth of *B. allii*, *B. cinerea*, *B. fabae*, *B. paeoniae*, and *B. tulipae* on malt agar but was not lethal. A continuous 3-day treatment caused a 1-day delay in sporulation. The treatment had no effect on *B. cinerea* on lettuce seedlings [see below].

Sirry (A. R.). **The effect of relative humidity on the germination of Botrytis spores and on the severity of Botrytis cinerea Pers. on Lettuce.**—*Ann. agric. Sci., Cairo*, **2**, 1, pp. 247–250, 1957. [Arabic summary.]

The spores of *B. allii*, *B. cinerea*, *B. fabae*, *B. tulipae*, and *B. squamosa* germinated only at 100% R.H. at 21° C. *B. cinerea* spores infected 62·5% lettuce plants [see above] at 98% R.H., lower humidities giving progressively less infection down to 12·5% at 80% R.H.

Bolton (J.). **Records of investigations 1955–56.**—*Bull. Dep. Sci. Agric. Barbados* 25 (N.S.), 24 pp., [? 1958].

In the section on minor elements (pp. 19–20) variations in the susceptibility of different types of plant, and also of different strains within a species, to 'lime induced' chlorosis [cf. **34**, p. 816] is noted. This is common on young sugarcane in Barbados, usually disappearing in a few weeks. Leaf analysis for minor elements showed no abnormalities for those tested, but further investigation of the effect of K on the incidence of chlorosis in the island is desirable.

Peterson (E. A.). **Observations on fungi associated with plant roots.**—*Canad. J. Microbiol.*, **4**, 3, pp. 257–265, 2 graphs, 1958.

Investigations at the Canada Dept Agric., Ottawa, and Rothamsted Experimental Sta. indicated that the soil fungal flora associated with plant roots is influenced by the age of the plants and the soil type. Total numbers of Penicillia and certain spp. of Mucorales were greater on root surfaces and in the rhizosphere of seedling wheat than of that in mature stages of growth, a change probably related to variations in the type of root secretions with increasing age. The degree of fungal stimulation, however, is more dependent upon soil type, the rhizosphere effect being more marked in an infertile sandy soil than in a more fertile clay.

Depending upon soil type, spp. of *Fusarium* or *Cylindrocarpon* and several sterile dark fungi predominated on roots of healthy red clover and wheat, though relatively rare in rhizosphere and non-rhizosphere soil. In acid sandy soil *Fusarium* was predominant, with little *Cylindrocarpon*, in alkaline chalk the position was reversed. The dark fungi seemed to originate mainly from internal tissue.

Gołębiowska (Mme J.). **Zastosowanie metody Lochheada do badania rozprzestrzenienia w głębie drobnoustrojów czynnych przy przemianach fosforu.** [The use of Lochhead's technique in studies on the spread in the soil of micro-organisms taking part in the phosphorus reactions in the soil.]—*Acta microbiol. Polonica*, **6**, 1, pp. 17–27, 10 graphs, 1957. [Russian summary.]

Lochhead's qualitative and quantitative estimation technique [**28**, p. 141] was used to determine the reactions of soil micro-organisms to different P sources, which were: K_2HPO_4 (easily soluble), $Ca_3(PO_4)_2$ (only slightly soluble), and organic glycerophosphate. The growth of colonies was estimated using a 1–4 scale (min.–max. growth). The presence of dissolved $Ca_3(PO_4)_2$ was determined colorimetrically. With this technique 6 groups of micro-organisms were delimited: (1) those utilising organic and mineral P sources, (2) those using an organic P source, (3) those using a mineral P source, (4) those mineralising organic P sources in excess of their needs,

(5) those utilising the insoluble $Ca_3(PO_4)_2$, and (6) those dissolving the $Ca_3(PO_4)_2$ in excess of their needs.

From among 57 microfloral units examined from different soils with various types of vegetation, the majority belonged to either group 1 or 5. It was noted that organisms from rhizospheres were of group 2 type, while those from outside the rhizosphere were of group 3 type; there was also a marked relationship between the age of vegetation and the type of micro-organisms in the rhizosphere [see above].

Nishimura (S.). **Observations on the fusaric acid production of the genus Fusarium.** —*Ann. phytopath. Soc. Japan*, **22**, 4–5, pp. 274–275, 1957. [Japanese. Abs. from English summary.]

It is reported that in a study of 25 strains of 6 spp. of *Fusarium* all strains belonging to *F. oxysporum* and *F. moniliforme* [*Gibberella fujikuroi*] produced fusaric acid in culture, whereas those of other spp. (*F. solani*, *F. lateritium* [*G. lateritia*], *F. roseum*, and *F. nivale* [*Calonectria nivalis*]) did not. This feature may prove useful in studies of speciation in Fusaria.

Schneider (R.). **Untersuchungen über Variabilität und Taxonomie von Fusarium avenaceum (Fr.) Sacc.** [Studies on the variability and taxonomy of *Fusarium avenaceum* (Fr.) Sacc.]—*Phytopath. Z.*, **32**, 1, pp. 95–126, 9 fig., 3 graphs; 2, pp. 129–148, 6 fig., 1 graph, 1958.

At the Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Mycologie, Berlin-Dahlem, 68 single spore isolates of *F. avenaceum* of different origin were examined in pure culture. The freshly isolated strains all showed the same features in their original cultures even in different media. These are taken to be typical of the species and are listed. The single spore progeny of the initial cultures of all strains developed 70–100% variations [**33**, p. 724].

Following a discussion of the factors concerned in the variation of the fungus in pure culture, the author examines the classifications of Wollenweber [**23**, p. 410] and Snyder & Hansen [**25**, p. 366]. He does not accept the merging of the sections Roseum, Arthrosporiella, Gibbosum, and Discolor into a single species [loc. cit.].

In the 2nd paper it is demonstrated that the morphological deviations of 3 variants from the original form of the fungus are linked with a loss of virulence and pathogenicity. They differed in pathogenicity not only from the original but also among themselves. In infection tests it was impossible to recreate the original virulence and pathogenicity by single or repeated passage through the host. The re-isolations were identical with the original inoculum.

The forms from cereals, *Lupinus* spp., and carnation were not only pathogenic to their own hosts and to closely related spp. and those of other genera in the same family, but also gave positive results in cross-infection tests. Thus, *F. avenaceum* is not host specific.

Terterevnikova-Babayan (Mme D. N.). Ржавчиные паразиты культурных и дикорастущих растений Армянской ССР. [Rust parasites of cultivated and wild plants of the Armenian S.S.R.]—186 pp. Yerevan State University V. M. Molotov, Yerevan, 1952. Roubles 9.25.

In this publication information is gathered together from all the laboratory, field, and herbarium studies over 5 yr. on the rusts of Armenia [cf. **37**, p. 458]. Of 160 species, 88 belong to *Puccinia* and 35 to *Uromyces*. The following are 1st records for Armenia: *Uromyces dactylidis* and *Puccinia dactylidina* [**36**, p. 592] on orchard grass (*Dactylis glomerata*), *U. fallens* on clover, *U. fabae* [map 200] on *Vicia* and *Lathyrus* spp., *U. pisi* on *Lathyrus* spp., *P. porri* on Liliaceae and *Allium* spp., *P. gladioli* on *Gladiolus* spp., *P. menthae* [map 211] on *Mentha* spp., *P. antirrhini* [map 40] on Scrophulariaceae, *P. helianthi* [map 195] on *Helianthus* spp., and *P. carthami*

on *Carthamus* spp. There is a key (pp. 146–169) to rusts on hosts of economic importance.

Batista (A. C.), Nascimento (M. L.), & Costa (C. A. A.). **Ascomicetos de interêsse para a fitopatologia.** [Ascomycetes of phytopathological interest.]—*Rev. Agric., Recife*, **1**, 1, pp. 9–13, 7 fig., 1958. [English summary.]

The 5 spp. described include the new *Ceratostoma mexicanensis* Batista *et al.* on oak (*Quercus* sp.), and *Valsaria natalensis* on *Magnolia glauca.*

Pilát (A.). **Mushrooms.**—340 pp., 120 col. pl., 6 fig., London, Spring Books, [1958]. 50*s.*

This is a revised English edition of 'Naše Houby' [**37**, p. 580].

Kanngiesser (W.). **Diagnose pflanzlicher Viren mittels Elektrophorese.** [Diagnosis of plant viruses by means of electrophoresis.]—*Jb. bayer. Landw.*, **35**, 4, pp. 493–503, 7 fig., 1958.

A general note on the identification of plant disease viruses by paper electrophoresis.

Mišiga (S.) & Valenta (V.). **Přenos vírusu stolburu prostředníctvom niektorých druhov Kukučín.** [Transmission of stolbur virus with the aid of some species of Dodder.]—*Biológia, Bratislava*, **12**, 9, pp. 652–660, 4 fig., 1957. [Russian, German, and English summaries.]

At the Czechoslovakian Academy of Sciences, Bratislava, the tomato stolbur virus [**36**, pp. 87, 781] was transmitted from naturally or experimentally infected *Convolvulus arvensis*, tobacco, and tomato to white and alsike clovers, *Vinca rosea*, tomato, and tobacco by means of *Cuscuta campestris*, *C. trifolii*, and *C. epilinum.* However, owing to the comparatively low proportion of successful transmissions the method is unlikely to be widely applicable in experimental work.

Transmission to members of the Apocynaceae and Fabaceae has enlarged the host range of the virus and confirmed analogies with beet yellows in a restricted sense. The ability of stolbur to infect clovers under natural conditions demonstrates its potential importance for forage crops, which might also serve as reservoirs of infection.

Valiega (J.), Cenoz (H. P.), Tessi (J. L.), Frecha (J. H.), & Rodríguez A. (P.). **Comportamiento durante 1957 de Trigos, Avenas y Cebadas en ensayos de resistencia a enfermedades.** [Performance of Wheats, Oats and Barleys in 1957 in disease resistance tests.]—*Bol. Inst. Fitotec. Castelar* 7, 4+14 unnumbered pp., 6 graphs, 1957. [Mimeographed.]

A fully tabulated report on the annual cereal tests carried out by the Instituto de Fitotecnía Castelar, Argentina.

Ark (P. A.) & Thompson (J. P.). **Antibiotic properties of the seeds of Wheat and Barley.**—*Plant Dis. Reptr*, **42**, 8, pp. 959–962, 2 fig., 1958.

At the University of California, Berkeley, extraction of seed of 8 barley and 7 wheat vars. with double their amount of distilled water or absolute methyl alcohol (the former extracts being more active) showed the presence in the seed of an antibiotic principle active against Gram+(but not Gram—) bacteria and against a number of fungi. The antibiotic principle was not destroyed either by lyophilization, air drying (4 days), or partial autoclaving; its content varied considerably according to the variety used.

Lange-de la Camp (Maria). **Helminthosporium sativum in Mittel- und Norddeutschland.** [*Helminthosporium sativum* in Central and North Germany.]—*Phytopath. Z.*, **32**, 2, pp. 167–180, 4 fig., 3 graphs, 1958.

Tests at the Institut für Phytopathologie, Aschersleben, Germany, together with

field observations confirmed the occurrence of *H. sativum* [*Cochliobolus sativus*] on wheat, barley, and rye in C. Germany on the E. edge of the Harz mountains, and on barley in E. Holstein, and it appears to be much more widespread than is normally assumed from the leaf symptoms. This results from secondary infections, the conditions for which—warm weather in May–June—vary considerably from year to year, whereas transmission from infected stubble to young seedlings is much less affected by the weather [cf. **36**, p. 581].

Physiologic races were detected among the isolates from C. and N. Germany. One, H93, was highly pathogenic to barley and wheat, whereas H3 was less pathogenic to both cereals. Differences in resistance to the disease were found: summer barleys Frisia, Freya, and Saale were highly susceptible; the Hadmerslebener strain the least. The susceptibility of the summer wheat vars. tested, except Peko, varied according to the isolate used.

Gorter (G. J. M. A.). **Wheat diseases in the summer rainfall region.**—*Fmg in S. Afr.*, **34**, 5, pp. 14–16, 4 fig.; 6, pp. 44–45, 3 fig., 1958.

This popular account of wheat diseases in S. Africa deals with loose smut [*Ustilago nuda*: **34**, p. 219], 6 vars. immune from which are noted, bunt [*Tilletia caries*], rust [*Puccinia graminis*], leaf rust [*P. triticina*], and glume blotch (*Septoria nodorum*), which is particularly severe in the E. Highveld region; a resistant var., Sonop, is recommended.

Trunov (G. A.). Роль минерального питания в повышении болезнеустойчивости Пшеницы. [The role of mineral nutrition in increasing resistance to diseases in Wheat.]—*J. Kharkov agric. Inst.*, **13**, 50, pp. 107–116, 1957. [Abs. from *Referat. Zh. Biol., 1958*, 7, pp. 189–190, 1958.]

Two soil applications of KCl (8 kg./ha.) increased the resistance of the winter wheat Lutescens 238 to brown rust [*Puccinia triticina*: **37**, p. 331]. Damage was halved and grain yield increased by 18%. With Artemovka spring wheat infection was lowered 16·1% and that by mildew [*Erysiphe graminis*: **36**, p. 581] halved. Applied before sowing, P (90 kg./ha.) and KCl (60 kg./ha.) increased the resistance of spring wheat to dwarf bunt [*Tilletia contraversa*: **37**, p. 345]. Early spring application of 30 kg./ha. of NH_4NO_3, P, and KCl decreased dwarf bunt infection in winter wheat. N used in the form of urea decreased mildew infection from 20–13·4%.

Bromfield (K. R.). **The effect of temperature on seedling reaction of selected Wheat varieties to Puccinia graminis tritici.**—*Diss. Abstr.*, **18**, 1, p. 20, 1958.

Of 87 wheat vars. tested at the University of Minnesota with *P. graminis tritici* races 17, 38, 56, 49, and 139 [**35**, p. 664], some proved resistant at 62, 70, and 85° F. [**34**, pp. 28, 776], some were susceptible at all 3 temps., while some exhibited temp. sensitivity. Further trials involving the last group and races 17, 38, 56, 11, and 15B indicated that in general they began to lose resistance at 70° and were fully susceptible at 76–78°. The temp. sensitive seedlings regained their resistance when transferred back to 70°. Resistance was retained at 77° if daily exposures were less than 10–12 hr., but lost when longer than 14 hr., while high temperature exposure for 12 hr. produced mesothetic reaction.

Rowell (J. B.), Olien (C. R.), & Wilcoxson (R. P.). **Effect of certain environmental conditions on infection of Wheat by Puccinia graminis.**—*Phytopathology*, **48**, 7, pp. 371–377, 1 fig., 3 graphs, 1958.

A fuller account of studies by the U.S. Dept Agric. and the University of Minnesota, St. Paul, already noticed [**37**, p. 273].

Volosky de Hernandez (Dora). **Two Chilean Wheat varieties which facilitate the determination of physiologic races of Puccinia graminis tritici.**—*Robigo, 1958*, 5, pp. 13–14, 1958. [Spanish translation.]

The Chilean wheat var. Mentafen (Mentana × Thatcher) was used to distinguish race 29 of *P. graminis*, recently noticed, and Millafen for race 11, which reappeared after a 5 yr. absence.

Massenot (M.). **Distribution of the physiological races of Puccinia graminis tritici isolated to date in Europe and in the countries of the Mediterranean basin.**—*Robigo, 1958*, 5, pp. 2–5, 1958. [French and Spanish translations.]

A geographical distribution list of races of *P. graminis* on wheat; 14, 15, 17, 21, 24, 34, 40, and 75 are stated to be the most widespread, 21 being on the increase since 1950 and 14 on the decline.

Bócsa (Eva). **Studies on the physiologic specialization of Wheat black rust, Puccinia graminis tritici Pers., in Hungary.**—*Robigo, 1958*, 5, pp. 5–7, 1958. [German and Spanish translations.]

A study of the races of *P. graminis* in Hungary, inaugurated in 1955–56, showed race 21 to be the most prevalent (76%), followed by 14 (16%), and 40 (8%).

Rojas Mendoza (E.). **Race 29 of Puccinia graminis tritici Ericks and Henn (black rust of Wheat) in Peru.**—*Robigo, 1958*, 5, pp. 7–10, 1958. [Spanish translation.]

This further report [cf. **36**, p. 93] from La Molina Agricultural Experimental Station, Peru, on the races 189 and 15B–2P, and on the new virulent race 29 of *P. graminis* notes that the latter behaved differently than in other countries, as is shown in a tabulated comparison. These races were all found in N. Peru, at Libertad, and it is suggested that barberry in the highlands is the source of new, virulent races and that its eradication is to be recommended.

Postigo (R.), García R. (G.), & Rondón (M.). **Physiologic specialization of Puccinia graminis var. tritici, P. rubigo-vera var. tritici, P. glumarum var. tritici, P. graminis var. avenae, and P. coronata var. avenae in Peru in 1956.**—*Robigo, 1958*, 5, pp. 11–13, 1958. [Spanish translation.]

At the Escuela Nacional de Agricultura, La Molina, Peru, 19 races of *P. graminis* on wheat were distinguished, of which 15B was predominant (45%), followed by 19 and 17 (26%); 189 (4%) and the remaining 15 races amounted only to 28%, 7 races being determined only once and 4 being as yet undescribed. The most prevalent races of *P. rubigo-vera* [*P. triticina*] on wheat were 61 (33%), 57, 12, and 77, together making up 66%. In *P. glumarum* on wheat 11 races were determined. On 4 differential oat vars. races 6 (58%), with 2 biotypes differentiated by Richland, 4 (28%), 7, and 3 of *P. graminis* were determined. The dominant race of *P. coronata* on oats was 224 (44%), followed by a new race (9%).

Geis (J. R.), Futrell (M. C.), & Garrett (W. N.). **A method for inoculating single Wheat leaves with more than one race of Puccinia graminis f. sp. tritici.**—*Phytopathology*, **48**, 7, pp. 387–388, 1 fig., 1958.

At Beltsville, Maryland, and the Texas Agricultural Experiment Station, College Station, small pads of filter paper, immersed in a water suspension of the spores required, are attached to marked portions of a seedling leaf with cellophane tape. Pot plants so treated are kept in a humidity chamber overnight; field inoculations are made late on a humid afternoon. The 'patches' are removed the following morning, after allowing any moist tape to dry out. The technique has given 90–95% or more infections, and is as effective as other more cumbersome methods, including glass jar incubation.

Wilcoxson (R. D.), Tuite (J. F.), & Tucker (Shirley). **Urediospore germtube fusions in Puccinia graminis.**—*Phytopathology*, **48**, 7, pp. 358–361, 1 fig., 1958.

At the University of Minnesota, St. Paul, anastomoses were observed between uredospore germ tubes of 9 isolates of *P. graminis* [**36**, p. 461; **37**, p. 81], *P. g.* var. *tritici* combining with 4 other vars. of *P. graminis*. Anastomoses took place readily on agar media and host surfaces, occasionally in mineral oils. Fusion bodies formed readily on water agar with added sugars or salts, infrequently on wheat seedling leaves, and not at all in mineral oil. In the fusion bodies 2–4 nuclei were commonly seen; apparently they may pass out of the germ tubes in which they originate, combination of materials from different sources possibly furthering the production of new biotypes.

Romig (R. W.). **Stomatal exclusion of leaf rust of Wheat.**—*Diss. Abstr.*, **18**, 1, pp. 38–39, 1958.

It was observed at Purdue University that during anthesis there was almost complete stomatal exclusion of *Puccinia recondita* [*P. triticina*] in the peduncles and sheaths of many wheat vars. with thick-walled guard cells, though the leaves, where guard-cell walls are thinner, were penetrated readily. Similar exclusion of crown rust [*P. coronata*] occurred in Butler wheat. Treatments affecting guard cells indicated that stomatal function was involved in the exclusion mechanism; decapitation of tillers at anthesis eliminated ability to exclude, which was regained when 1% auxin-lanoline was placed on the cut stump. According to their rust reaction wheat vars. were divided into 'slow rusting' or hyposusceptible (Fairfield, Purdue, No. 1, Purkoff, Nittany) with resistance correlated with the percentage of effective pathogen entries, resulting in slow increase and spread of the disease, which did not, however, provide any yield advantage over the 'fast rusting' or hypersusceptible vars. (45–1834–1 and Butler) which allowed rapid spread of leaf rust. Greenhouse and field experiments showed that ability to penetrate was not a biotype function.

Vörös (J.) & Szirmai (J.). **Védekezési kísérletek mellékтermékként előállított actidionnal a Buza kőüszög (Tilletia foetida (Wallr.) Liro) ellen.** [Experiments to control stinking smut (*Tilletia foetida* (Wallr.) Liro) of Wheat by means of actidione obtained as a by-product.]—*Növénytermelés*, **6**, 3, pp. 249–256, 1957. [Russian and English summaries.]

Field trials by the Research Institute for Plant Protection, Budapest, with actidione obtained from streptomycin ferment, for the control of *T. foetida* [**37**, p. 82] showed that dusting with actidione, containing 2000 μ/g. of active material gave the best results and with one exception was as effective as the standard Hg dusts and other seed dressings now in use. Wet treatment proved phytotoxic and less satisfactory.

Taylor (D. K.). **The nature and relationship of bunt resistance in a hard red winter Wheat selection and certain tester varieties.**—*Diss. Abstr.*, **18**, 1, p. 19, 1958.

During investigations at the State College of Washington, wheat sel. 191 Red was intermediate in resistance to *Tilletia caries* and *T. foetida* race L 10, susceptible to T-11, T-13, and L-9, and resistant to 21 races, that is, the same as Ridit [**35**, p. 756; **37**, p. 469]; failure of T-10 to produce differential reactions on 191 Red, Ridit, and Brevor indicated that these 3 had at least 1 common factor for resistance to T-10. Resistance in 191 Red is governed by 1 recessive conditioning resistance to L-8, T-10, and T-15; 1 intermediate allowing approx. 50% of heterozygous plants to be susceptible, but providing resistance to T-7, T-10, T-16, and, possibly, T-14; and 2 major factors.

A close linkage between the intermediate factor of 191 Red and the HH factor

of Hussar was indicated; this var. also carries a factor for resistance to T-7 and T-11. Hohenheimer carries 1 major dominant for resistance to T-11. As the F_2 of 191 Red × Brevor was susceptible to T-11 and T-13, the resistance of Brevor to these 2 appeared to be governed by a recessive or an intermediate factor and not by the dominants conferring resistance to L-9 and L-10.

Sill (W. H.). **A comparison of some characteristics of soil-borne Wheat mosaic viruses in the Great Plains and elsewhere.**—*Plant Dis. Reptr*, **42**, 8, pp. 912–924, 2 fig., 1958. [44 refs.]

The results are presented of a detailed study at the Kansas State College, Manhattan, of soil-borne wheat mosaic viruses [**37**, p. 711; map 84] from various parts of the U.S.A. and comparison made with the results of previous workers. Features compared included symptoms, host range, virus-infested soils and the behaviour of the virus therein, epidemiological factors, methods of spread, and losses. It is concluded that all the viruses concerned are strains of 1 virus, the only essentially differing symptom being a rosette reaction noted on a few wheat vars. in Illinois and eastward.

The author considers Japanese soil-borne mosaic virus [**16**, p. 665] to be a closely related strain of the same virus, but that soil-borne oat mosaic virus [**35**, p. 443], though closely related, must be regarded as distinct.

Rochow (W. F.). **The role of aphids in vector specificity of Barley yellow dwarf virus.**—*Plant Dis. Reptr*, **42**, 8, pp. 905–908, 1958.

Comparison at Cornell University, New York, of *Rhopalosiphum fitchii* and *Macrosiphum granarium* from New York and Washington, respectively, as vectors of 5 isolates of barley yellow dwarf virus [cf. **36**, p. 91] observed to be vector specific [see below] showed that transmission by these aphids was sufficiently alike to indicate that the basis for the vector specificity of such isolates rests with the virus rather than with the vector.

Bruehl (G. W.). **Comparison of eastern and western aphids in the transmission of Barley yellow dwarf virus.**—*Plant Dis. Reptr*, **42**, 8, pp. 909–911, 1958.

At the Washington Agricultural Experiment Station, Pullman, comparison of *Rhopalosiphum fitchii* and *Macrosiphum granarium* [see above] from New York and Washington, respectively, as vectors of 28 collections of the Washington barley yellow virus showed both to transmit every collection. These observations indicate that the prevalence of the vector specific strains of the virus in New York and their relative absence in Washington results from a regional difference in the virus complex. It is suggested that *M. granarium* may have long predominated in New York, but that aphid spp. have fluctuated considerably in Washington, causing versatility in the virus as regards its vector relationships.

Toko (H. V.). **Some relationships of insect vectors to isolates of the cereal yellow-dwarf virus.**—*Diss. Abstr.*, **18**, 1, pp. 19–20, 1958.

It is reported from State College of Washington that 31 of 33 field isolates of [barley] yellow dwarf virus were transmitted by both *Rhopalosiphum fitchii* and *Macrosiphum granarium*. One (A.G.) from volunteer barley was transmitted by the former and the other (E.G.) from wild oats by the latter only. Both produced typical symptoms on wheat, oats, and barley (though more so on the two last-named), A.G. being the more virulent. The efficacy of transmission of both was enhanced by increasing either the min. acquisition period of 24 hr. or the min. infection feeding period of 4–8 hr. There was no interaction between E.G. and A.G.; symptoms produced on oats by their simultaneous presence never exceeded those produced by A.G. It is concluded that they are closely related strains of barley yellow dwarf virus.

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